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OF RC LUST

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80 NOW!

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car action

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big-block flatbed

RAY M18
high-performance
WD micro

**GO FASTER
NOW!**

Mod-motor timing explained

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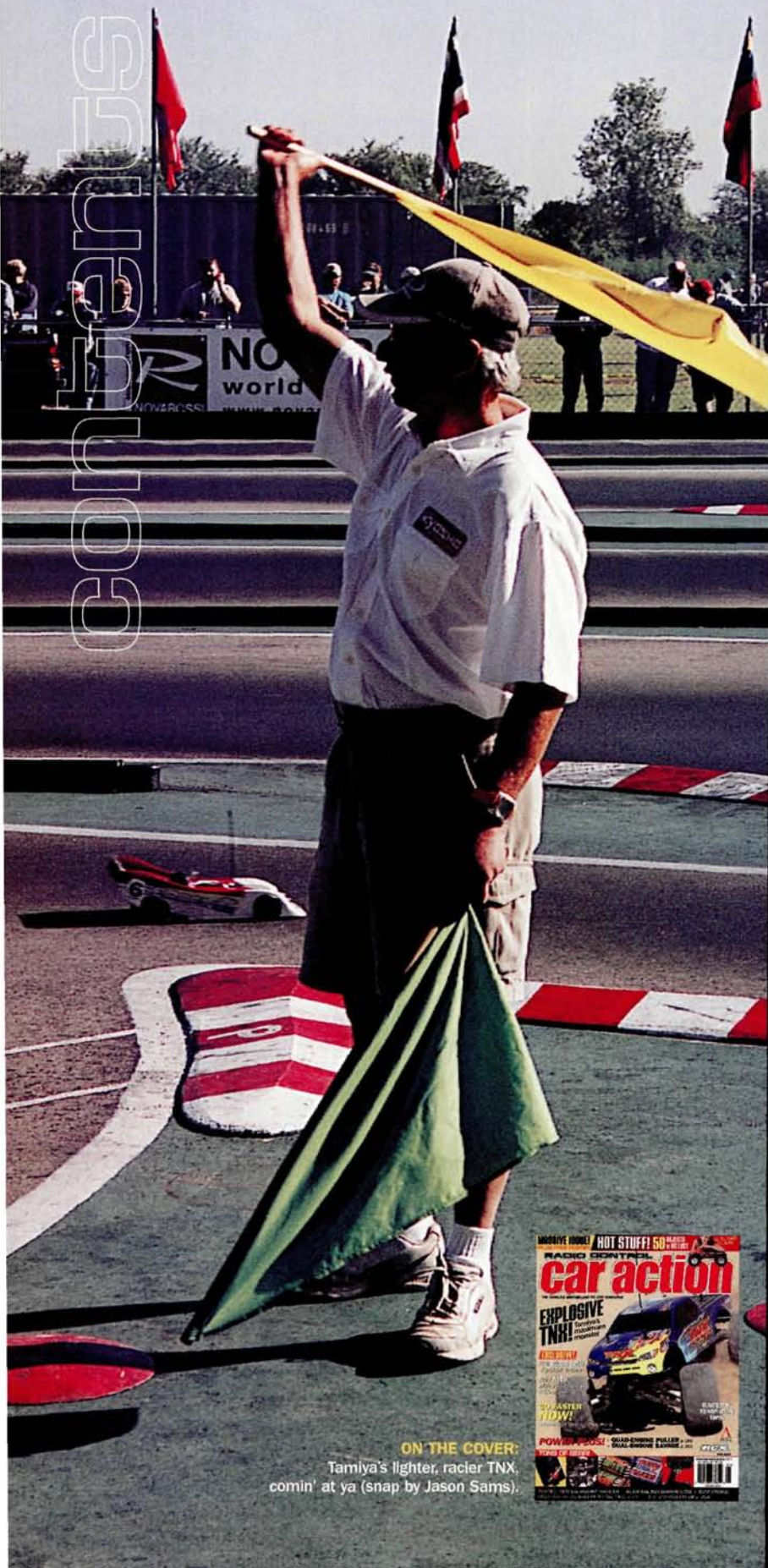


TESTED: TAMIYA KNIGHT HAULER | ALEX RACING BARRACUDA | SVM CRONO
SOI RTR PLUS: PRO PAINTING TIPS p. 278 | TRX 2.5 POWER-UP p. 264

RADIO CONTROL **car action**

VOLUME 18 ■ NUMBER 1 ■ JANUARY 2004

comin' at ya



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Tamiya's lighter, racier TNX,
comin' at ya (snap by Jason Sams).



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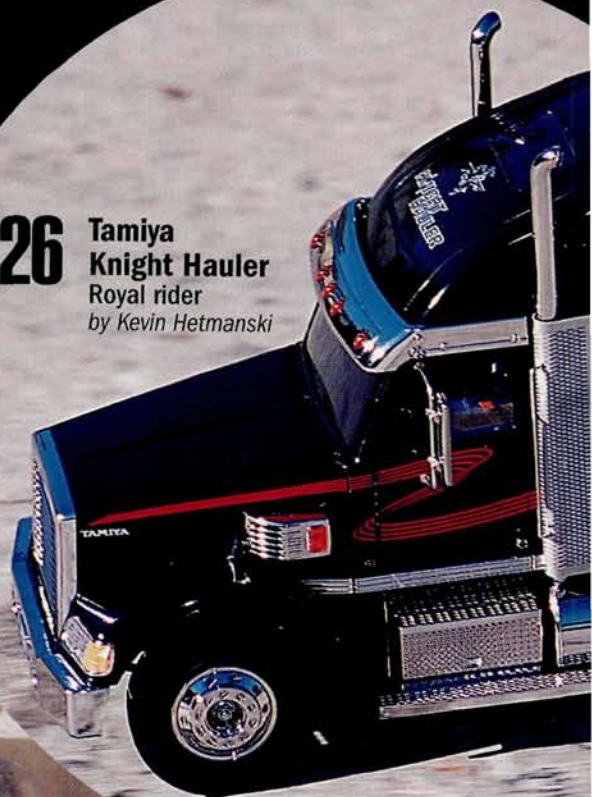
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Start Lusting!

It's "Lust List" time again, and we have a huge selection of the most sought after RC items to share with you. You can get all of it right now (or at least very soon), but there's still a lot of must-have stuff out there that has yet to be invented. For example ...

AN ESC WITH A GRAPHIC DISPLAY.

I know that Keyence makes one, but its 8-segment display isn't what I'm after. I want a little Game-Boy-style LCD screen that spells out all of the ESC's functions and lets me know what's up if something goes wrong by flashing helpful messages like: "motor circuit incomplete," "check for hung brush," "shutdown due to thermal overload," or "the real problem is your driving."



BATTERIES THAT TELL YOU WHEN THEY'RE DUMPED. After a race, the pack is warm. After a charge, the pack is warm. After I put a warm, dumped pack in my car, my chances at the Main are over. Can someone please create some kind of visual thingy that makes the word "DUMPED" appear on the cells when they have been depleted and disappear when they are charged?

A DRIVING GAME ON YOUR RADIO. The screen is already there ... how cool would it be if you could select "game," which would then let you play a racing game on the screen using the trigger and wheel to drive?

CHANNEL-FREE RADIOS. Crystal-free is great, but I don't even want to turn the dials anymore. I just want to switch the radio on, let it figure out which channel is open, and set itself to suit. Same thing for the receiver.

Start inventing! This stuff would be gold!

IN THIS ISSUE

75 YEARS OF RC. One of *RC Car Action's* sister mags, *Model Airplane News*, is celebrating its 75th anniversary (I'll save you the math: issue number one arrived in 1929). *Model Airplane News* is the mag that started it all; long before the era of "RC" began, powered model cars were included in *Model Airplane News*. In honor of that, we take a retrospective look at the RC breakthroughs the mag brought to readers (including radio control itself) as well as at the birth of *RC Car Action*. Lots of cool blasts from the past!

HIGH TECH, SMALL SIZE. There isn't much 1/10-scale technology left to trickle down to 1/18 scale; the XRAY M18 pretty much grabbed it all! See this hot new micro up close in our "First Look."

KEEP ON TRUCKIN'. Tamiya's latest ultra-scale big rig gets road-tested by our resident truck guy, Kevin Hetmanski. The sinister-looking ride looks a lot like Kurt Russell's 18-wheeler in the movie "Breakdown" (which you should see because it's a good thriller) as well as the mobile workshop rig from "Knight Rider" (which you should watch because it's hilarious).

THE POWER TWIST! Loosen two screws and twist; that's about all you need to do to dial up more power from your modified motor. OK; there's a little more to it than that, but you'll see. "How To: Set Mod Motor Timing" makes it all crystal-clear.

See you in 30.

Peter Vieira
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readerswrite

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WRITE TO US! Send snail mail to "Letters," Air Age Inc., RC Car Action, 100 East Ridge, Ridgefield, CT 06877-4606 USA, or email readerswrite@airage.com. We'll edit them as we see fit, and we don't have room to answer every one.

WHAT TOOK SO LONG?

I was glad to see the Monster GT on the December 2003 cover, but all I can say is, "What took so long?" I saw the truck in the December 2002 issue, and then I saw it again in the January 2003 "Lust List." I thought I'd be able to get one in the next month or so; I didn't think it would take a year! I mean, I can see if the Monster GT was a total prototype or something when you first showed it, but it looked pretty "done" to me. [email]
Sam Hart

Associated did a lot of testing with the Monster GT, and the longer you test something, the more things you find to fix or improve. So, although the Monster GT did appear to be "done" a year ago, there are lots of unseen things that the engineers could have been monkeying with. They undoubtedly tested different materials to ensure durability, and sorting out the best gear ratios and suspension settings takes a lot of time. Not to mention all the other details that go into an RTR like the Monster GT: the assembly sequence must be determined and assembly-line builders have to be trained; the owner's manual has to be created; the radio gear has to be spec'd out; printed body graphics have to be created; and the packaging has to be designed with dealers' shelves and shipping considerations in mind. Add in another final round of extensive testing to make certain everything is right, and then the product is finally ready to ship—but the engineers will still be wishing they had more time!

—Pete

AND THEY ALL LIVED HAPPILY EVER AFTER

I know you get lots of letters, but this is a good story. I began racing nearly 10 years ago when I was 8 or 9 years old. I started out with a Trinity Street Spec (remember those?), and I was hooked. A few years later, I was good enough to buy an RC10L30 and be competitive, but being a racer on a 13-year-old's income was hard. I raced everywhere so I could get better, and I slowly advanced. But some of the guys at a certain track treated me like dirt (you know, the guys who won't talk to you until you beat

them), and yet I secretly looked up to them as racers.

I stuck with it, and in the following years I raced everything I could. Last winter, I bought a Kyosho MP 7.5 and put every good part into it I could—\$1,200 worth. Finally those racers said, "Hey kid, need a hand?" I thought it was a joke, so I said, "Sure," but they took my car and totally rebuilt it with their setups. I got the car back and WOW! They were so nice to me and helped me every chance they got. After years of trying, all the sponsored guys came around and accepted me. I want to thank them; they know who they are. [email]
Chris Ponce Jr.
Winchester, NH

Great story, Chris! And by the way, you probably could have just asked those guys "who treated you like dirt" for help rather than waiting for them to offer it. If they're cool now, they were probably cool then.

—Pete



BOGGLED BY BEARINGS

I want to upgrade my car's ball bearings, but I'm confused about which type to pick for my Nitro TC3 RTR. What's the difference between metal-shielded, rubber-shielded, Teflon-shielded and any other kind of bearings that I don't know about yet? [email]
Stephen Pagunuran

Usually "rubber-shielded" bearings are called "rubber-sealed" because they are virtually impervious to penetration by dirt and moisture. Unfortunately, they don't spin as freely as shielded bearings because rubber contact seals have more drag. Metal-shielded bearings spin most freely because no seal contacts the bearing races, but shielded bearings are also the most prone to contamination. Teflon-shielded bearings are a good compromise; the slick Teflon shields create little drag and protect the bearings against "dry" contamination almost as well as rubber seals do.

—Pete

NITRO RALLY 3

Are there any hop-ups for the Nitro RS4 3 that will convert it to off-road? I've noticed that some of the rally cars don't have any more ground clearance than a touring car. Any



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suggestions would be very helpful because I'm really new. Although I've only been into RC for about 3½ months, I'm learning very fast! I'm trying to become very competitive and want to find people in my area who run nitro on-road cars. [email]

Chris Palombo
Lake City, FL

First, I suggest you install a set of rally treads from HPI; there's a "Pirelli T" pattern and an aggressive knobby style. Then jack up the suspension's ride height and raise the body on the posts for more ground clearance, and hit the dirt. The RS4 3's shaft drive makes it ideal for off-roading; in fact, it's the basis for HPI's new MT2 4WD stadium truck!

—Pete

RUNNIN' ON MT

I got into RC a year ago, and I purchased an HPI Nitro MT in May 2003. I would like to make it go a lot faster. I'm thinking of putting a .21 engine in it, but I don't know which one, or if that size would even fit. I also don't know whether I would need a bigger tank and a new exhaust. Any help would be much appreciated. [email]

Daniel Bates

Dan, my man; I'd hold off on the engine swap; it's an expensive proposition and is best left to a skilled wrencher. It's also very tough on the MT's drive train. How do I know? We built

one in our "Mutant Machines" feature in the February 2002 issue, using a New Era conversion .21 kit. If you want your MT to go faster, consider going up two teeth on the clutch bell and installing street tires before plunging into a big-dollar engine conversion.

—Pete

LIKE, SURE

I have a DuraTrax Evader ST. Is there any way I can put, like, an F150 body on it or some other truck body? I don't really have any money to spend on it, so it will have to be cheap. If you can find one, I'd really like to have the info so I can get it. I also want to tell you guys, "Great mag"! I love it and read it every month. [email]

Jacob

Your Evader can wear bodies meant to fit the Team Losi Triple-XT. Pro-Line has a nice GMC Sierra but offers only an F-150 for Associated trucks. If you don't mind getting a little creative with body posts, you could try fitting Pro-Line's F-150 body for the Traxxas Stampede to your Evader. If you go that route, you can make just about any body fit your truck. Take a look at the 2003 edition of *RC Monster Trucks*; it shows you how to mount a truck body and uses the Evader ST as an example. Perfect!

—Pete

YOU SAID IT

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TRINITY

"I paid for all my RC stuff by myself"

First of all, thanks—thanks for this awesome magazine. I have been into RC cars for almost two years now and want to tell you my story. We were camping and my dad bought your magazine because he wanted to check it out because some people he knew drove RC cars. Well, that magazine started it all. It was the October 2001 issue, and after reading the whole thing, I decided that I really wanted to get into RC cars. That spring, I bought a DuraTrax Evader ST with my own money. Then I bought an HPI Savage and a Factory Team T3, and now I'm waiting for the Savage SS. You have also converted my younger brother to RC cars, and he has an RC10T3, too. I paid for all my RC stuff by myself and save up all of my money to put into the cars. I always think that if my dad hadn't bought that issue of *RC Car Action*, I probably wouldn't have gotten into RC cars at all. I love to read your magazine every month, and I look forward to all the new issues in the future. Once again, thanks *RC Car Action*.
Cort Christiansen, South Hyrum, UT

We appreciate the praise, Cort, but what really struck me is that you paid for all your gear yourself! Good for you. Take that, you other whiny kids.

—Pete ■



Each month, "Readers Write" sponsor Team Trinity awards the "You said it" letter writer the Reference body of his choice. This is the WASP, for the Kyosho Inferno MP-7.5.

mackin' new mini!

radioshack XMODS

In a sure sign that the apocalypse is upon us—brace yourselves—RadioShack has what we would call, “a real RC car.” Yes, it’s true; RadioShack’s new 1/28-scale XMODS line is the real deal, and they look ready to bring some seriously stiff competition to the market. The cars come with really trick modular bodies, which can be completely customized with various hoods, ground effects, spoilers, etc. The car itself features fully independent suspension, proportional steering and throttle control, and it has a top speed of 15mph (optional motors are available which propel it to speeds above 20mph). The car comes in its own unique clear, plastic carrying case (similar to a tackle box), and the included radio features dual-rate adjustment, servo trim, and it can even be switched up for a righty or a lefty! Tons of licensed mods are available from companies such as Eibach (springs), Ace, Enkei and Tenzo (wheels) and Sparco (steering wheel). In addition, a light kit is also available as one of many upgrades. But get this—the car sells at RadioShack outlets for only \$50! That’s roughly less than half what most other minis in its class cost. Currently, the cars are available in Japanese-tuner car trim (Acura RSX, Toyota Supra, etc.), but a future line of European-themed tuner cars should be right around the corner! RadioShack (800) THE-SHACK; xmodsrc.com.



A Force To Be Reckoned with

kyosho stadium Force

Kyosho has a brand-new 4WD stadium truck based on the tried and true TR-15 gas-powered buggy chassis. The new Stadium Force includes such features as a shaft-driven, 4WD drive train; it includes a GT15S-CR engine (equipped with pull-starter); has a countersunk aluminum main chassis plate; a high-capacity fuel tank; a dust-proof radio box; a sport-tuned muffler; aggressive pin-spike style tires; and the truck comes partially assembled.

Kyosho; distributed by Great Planes Model Distributors (217) 398-6300; (800) 682-8948; kyosho.com.



D6 Modified Motor Heavy D

Trinity’s new D6 mod motor is set to hit hobby-shop shelves at any time now. According to the folks at Trinity, during a year’s worth of racing the D5, they have been able to optimize its design, and that brings us to the new D6. The motor features a quad-magnet can that increases rpm, and by using the popular flat-wire armature, Trinity gives the D6 more torque to help build strong power at low rpm. In addition, a new, modified armature design results in more overall power, and an optional brush heat-sink system will be available to help cool the motor. The D6 will be available in both flat-wire and standard round-wire versions, and as soon as we get our hands on test samples, we’ll take a much closer look at this new offering from Trinity.

Trinity Products Inc. (732) 635-160; teamtrinity.com.

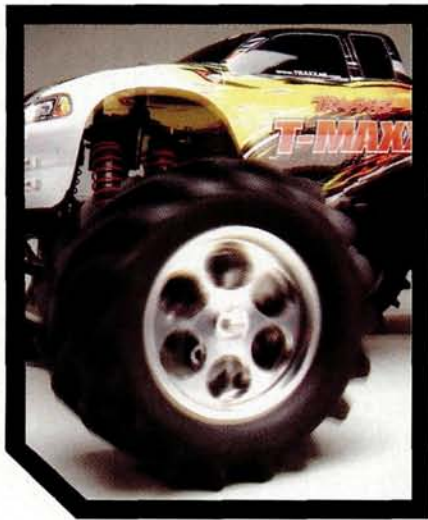


Maxx Dubs

GCG Racer Aluminum spinner wheels set

The dub craze is certainly catching on in RC, and GCG Racer has recognized that fact. This new aluminum wheel set with center spinner section is available for the Traxxas T-Maxx and HPI Savage. For those of you who aren't down with the dub scene, here's the skinny: the wheel insert stays put while the vehicle is in motion, making it look like the wheel is actually standing still. Then when the vehicle comes screeching to a halt, the center section spins like crazy—it's a wild setup!

GCG Racer (260) 409-2283.



The Missing Link

Du-Bro 4-40 Heavy-duty Ball Links

Ask any monster-truck aficionado what the weakest link is on his truck and most will tell you that it's the ball links that fail most often. Well, Du-Bro has heard the cry from many a frustrated monster trucker or rock-crawler owner and answered with these new heavy-duty ball links. The ball links have adjustable ball tension and are made with high-quality brass swivel balls for smooth friction-free operation, and they are available in packages of 2 or 12.

Du-Bro (847) 526-2136; dubro.com.



KillerB Especially for the Associated B4



TRI39300



Hopped-up Hexes

Pro-Line Aluminum T-Maxx Hexes

Pro-Line keeps adding more and more trick parts to its T-Maxx line of hop-ups. First, it was tires and wheels—then suspension kits, steering kits, ball-ends and bumpers! Well, next up are these aluminum hexes for the Traxxas T-Maxx. According to Pro-Line, the hexes are made of 6061 aluminum, blue-anodized for a clean look and are super-light. They also allow the use of Pro-Line's brake disc rotors. The aluminum hexes help your wheels to flex less, and you won't have to worry about stripping out the inside of the hex after long periods of running your truck. Pro-Line (909) 849-9781; pro-lineracing.com.

Mini Mad Force

Kyosho Mini-Z Monster Truck

Full details haven't yet been released, and we don't know the truck's official name or even much about its features, but we do know this much: the size of the Mini-Z/Overland and that it's a small version of the Mad Force monster truck. Take a close look at the chassis; MR-01-type battery holders rest underneath the silver "fuel cells" housing a pair of AA cells. We'll be able to tell you more very soon, but until then, get busy! Line up some Mini-Z cars for some "mini" crushing action.

Kyosho; distributed by Great Planes Model Distributors
217-398-6300; (800) 682-8948; kyosho.com.



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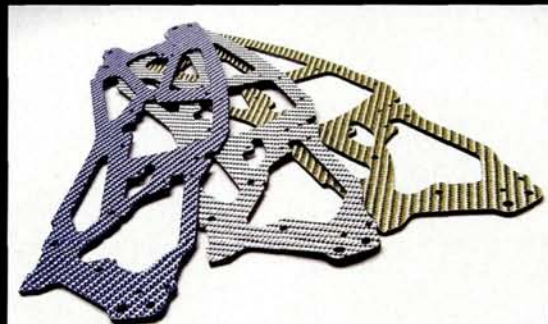


sweet savage

Art's Hobby savage graphite chassis plates

Get set to style out your Savage with these new slick graphite side plates. The 3mm-thick side plates are superstrong and light (they save roughly one ounce per pair). According to Art's Hobby, the plates are designed to withstand tons of punishment: you can jump, bash, or race with them. The graphite side plates are available in stylish blue, gold, or silver.

Art's Hobby (734) 455-1927; artshobby.com.



faster 4-wheeler

MRC/Academy rt-4 gp upgrades

The Academy RT4-GP RTR is a pretty impressive gas truck in its own right. To make it even more of a performer though, Academy recently released a complete line of hop-ups for the truck. You name it; they've got it—from universals and aluminum racing shocks to heavy-duty turnbuckles and carbon-fiber brake discs. They even have drive hexes and a complete slipper-clutch kit. So if you're looking to upgrade your truck, look no further; Academy has you covered!

MRC Academy (732) 225-2100; modelrectifier.com.



mid-size maxx motor

Picco "medium-block" .21 for the T-Maxx

Picco has just introduced the .21 (3.5cc) Monster P2 engine; it was designed specifically for the Traxxas T-Maxx. The largest displacement currently possible in a small-block configuration is about 18ci—approximately 3cc. Big-block engines can have much larger displacements, but their installation requires the purchase of expensive conversion kits. This new engine uses a slightly larger "medium block" to achieve a .21 displacement (3.5cc), yet it can be installed on the stock chassis and doesn't require any modifications. It apparently includes a new mount for T-Maxx installation. To ensure that the exhaust system can easily be bolted on, the Monster P2 has a header mounting system like the one used on the TRX 2.5. The Monster P2 is also designed to work with Traxxas' electric EZ-Start 2 system (standard on the TRX 2.5), and it will also be available with a pull-starter. Stay tuned for more information.

Trinity Products Inc. (732) 635-160; teamtrinity.com.



Nice-Lookin' Lexan

PTI Touring & Micro bodies

Several new bodies from PTI have hit the scene: a 200mm Mustang Cobra, a Ferrari-esque Micro body and a Rothmans Porsche GTP Micro body. The Mustang is made of 0.040-inch-thick Lexan, and it's equally at home on a track and in a concours competition. The two Micro bodies' low-slung profiles help the Micro RS4 get max traction, and all three come with a wing, window masks and decal sets.

PTI (714) 543-8112.



super snake sedan!

serpent 710 Nitro sedan

Serpent changed the world of nitro touring car design with the introduction of its Impulse a few years ago. Now Serpent aims to rock the touring car world again with its new 710 sedan. This is not a revised version of the current 705 car; it's an all-new machine that boasts the latest technology.

Here's the shortlist of what the car has to offer:

- 4mm-thick 7975 T6 aluminum chassis with woven graphite upper deck.
- Low CG laydown steering-servo positioning.
- Adjustable servo-saver and variable Ackerman positions.
- New, lightweight Centax-3 clutch designed specifically for the 710.
- One-way front differential.
- Externally adjustable rear diff.
- Adjustable front and rear roll center.
- Reactive caster-tuning option.
- Rear active toe; toe can be set to increase or decrease as the suspension is compressed.
- Lightweight, hard-anodized aluminum pivot balls.

Serpent Inc. USA (305) 639-9665;
info@serpent-usa.com; serpent.com.



The 710 has an adjustable servo-saver and variable Ackerman positions, so you can tune the steering response to your liking. The steering servo is mounted flat between the upper and lower chassis plates to lower the center of gravity.



Left top: the front end features a one-way differential that improves steering response when entering corners and boosts acceleration when exiting them. Eccentric bearing holders allow the front belt's tension to be adjusted. Left bottom: shims are used to adjust the vertical position of the upper hinge pin, permitting roll center adjustment, and the forward end of the upper hinge pin can be set lower to create reactive caster. Above: the 710 feeds power through a new, light, Centax-3 clutch that was designed specifically for this car. It's small and light enough to ensure the hardest possible acceleration. A lightweight, clutch-type, 2-speed transmission handles the shifting duties. Below: the lower plate is formed of 4mm-thick 7975 T6 aluminum, and the upper deck is woven graphite. Vertical braces reach around the engine and tie the rear bulkheads to the front of the chassis to form a more rugged, more rigid assembly.



readers' rides

YOUR BEST BUILDS

BY JOHN HOWELL



LOUIS BULL, MARCO ISLAND, FL
BOLINK SPORT 2000

Louis' Bolink Sport 2000 is a wild-looking contraption. The car is topped off with a Parma '55 Nomad body and sports a Trinity P94 10-turn mod motor under the hood for high-speed action. Other mods include a Novak Dually ESC, 3000 cells and New Era front and rear wheels (from its funny-car kit). The car is controlled with a Futaba Magnum Sport radio, and according to Louis, the car really flies; he has had it up to 65mph!

WIN A ONE-YEAR SUBSCRIPTION TO RC CAR ACTION MAGAZINE! Send a sharp, uncluttered, well-exposed color photo of your vehicle (no Polaroids) and a brief description to "Readers' Rides," *RC Car Action*, 100 East Ridge, Ridgefield, CT 06877-4606 USA. If we publish your photo, you'll receive a free, one-year subscription to *RC Car Action* and will be eligible to win the "Reader's Ride of the Year Contest." Write your address and phone number on your letter and on the back of every photo you send. Send email submissions to readersrides@airage.com.



JUSTIN GIBSON, DIAMOND BAR, CA
TRAXXAS T-MAXX

Justin's all-aluminum Maxx is the result of a year-long project. The truck was built up with a significant amount of diamond-plate material in addition to the standard mods that we typically see. The finished truck has been outfitted with an .18 engine; all-metal drive shafts; extra-wide A-arms; OFNA rims; metal-gear servos; an all-metal tranny with Robinson Racing internal gears; Integrity shocks; a Racer's Edge chassis; a gear locker in the rear (for better climbing abilities); and an aluminum gas tank. The truck is controlled by a KO Propo Mars EX-1 radio and is topped off with a Hummer body that Justin painted jet black with chrome window tint.



JAMES CROMWELL,
EDMOND, OK
TRAXXAS E-MAXX

James tells us that his Traxxas E-Maxx is set up with an aftermarket aluminum chassis, Integrity shocks, Trinity Monster Masher wheels and tires, an Airtronics MX-3 transmitter, Reedy Wild Maxx motors and aluminum transmission gears. It also has been modified with a complete MIP drive train and is topped off with a Burner's Customs painted body. James tells us that he built the truck for extreme speed, and it has been clocked at 52.3mph (by a cop, no less)!

reader's ride
OF THE MONTH



EDDIE BOOZE
LEWISBURG, WV
TRAXXAS T-MAXX

Eddie's truck is relatively stock except for an onboard temp gauge, Pro-Line paddle tires, RPM Clawz wheels and a Dahm's "Buggsy" body. The dish wheel covers were made from "stick on" side-view mirrors. According to Eddie, the truck kicks up major rooster-tails thanks to the Pro-Line paddles. He also tells us that the bodywork was inspired by one of our own "Body Shop" articles. Lookin' good, Eddie—your clever wheelcovers and perfect paint make your Maxx our Reader's Ride of the Month!

readers' rides

TOMMY AMOS, TALLAPOOSA, GA HPI NITRO RS4 3

Underneath this sleek-looking Ferrari body is Tommy's new HPI Nitro RS4 3. Aside from a few standard hop-ups, including a 2-speed transmission and a purple fuel filter, the car is relatively stock. The standard MX-3 radio system and HPI .15 engine are still in place—for now! Tommy plans to style-out his car with a few more mods pretty soon. Adding a little extra shine is a set of purple and chrome 26mm wheels that are held in place with purple aluminum wheel nuts.



TOM ARNDT, BURNEY, CA TRAXXAS T-MAXX

You can't tell by looking at it, but Tom's T-Maxx is more than 3½ years old! His truck is equipped with the following mods: a Parma Toyota Tundra body; RPM Titan wheels; a Megatech .16 engine; a Motor Saver air filter; an MIP Stinger exhaust; a Powerline engine mount and aluminum steering bellcranks; Team Associated shocks; Traxxas titanium hinge pins; Lunsford turn-buckles; and much, much more. Tom writes, "I've owned this truck for more than 3½ years and had hours of fun with it (I wish my wife liked it as much as I do)." Well, Tom; it sounds as if your wife may be han-kerin' for a T-Maxx of her own.

**Got
a New
RTR?
Power it
up with
Reedy!**



Reedy Quasar AC/DC Battery Charger.
Reedy's economical #610 "Quasar" peak-detecting charger plugs right into the wall (or works from any 12V power source) and adjusts from .5 amps to 6.5 amps to charge Ni-CD, Ni-MH or receiver packs.

#610 Reedy Quasar AC/DC Charger

Reedy Tire Warmers. Be ready for racing from the very first lap! Reedy Tire Warmers work from your 6-cell battery pack to pre-heat your touring car's rubber tires to race temperature.

#608 Reedy Tire Warmers



REEDY

**ROB JONES, NEWPORT NEWS, VA
TEAM ASSOCIATED T3**

Rob's lowered road racer usually places in the top three of the A-main at his local track. He hasn't won with it yet, but Rob tells us, "I'm working on it." He modified his truck with a Pro-Line GMC Sierra body; RPM wheels, rear arm mounts, ball cups and gear cover; Pro-Line Road Rage tires; a Novak Explorer 2 ESC; a Peak Dynasty motor and 2400 batteries; and a Futaba S9402 steering servo. In addition, Rob also set the truck up with Lunsford titanium turnbuckles, full ball bearings and all the cool blue stuff in the Factory Team T3 kit.



**JONAH COTTRELL, LAKE WORTH, FL
TRAXXAS T-MAXX**

Jonah's Traxxas T-Maxx has a whole host of hop-ups that help make the truck lighter and stronger, and he used enough parts to meet, as he puts it, "the eye-candy quota." The truck's list of mods include: a Robinson Racing disc brake; a New Era roll bar; Pro-Line Maxx Masher tires on Pro-Line wheels; RPM suspension arms; bulkhead braces and shock towers; a CVEC pipe; Powerline aluminum head, shocks and air filter; and Boca Bearing green, sealed bearings. Other mods include a Hitec metal-gear steering servo and a Prather fail-safe unit. Jonah and his wife painted the Pro-Line Power Wagon lid that tops off the truck. ■



Reedy Ni-MH Receiver Packs for Nitro Cars and Trucks. Reedy receiver packs give you the long-lasting, reliable power needed for nitro racing, and have a great low price that makes them your **BEST** choice!

#615 Reedy Ni-MH Receiver Pack. (Hump style for RC10GT, Monster GT, Etc.)

#614 Reedy Ni-MH Receiver pack. (Flat style for Nitro TC3, etc.)

Reedy's "Rated-X" Matched sport packs. Fully assembled in clear tubes so you can see the matching info right on the label of each cell. Don't settle for "mystery" cells in your sport packs... get Reedy's "X-Rated" packs and see the power you've been missing!

#697 Reedy "Rated-X" Sport Pack, Sanyo 3300 cells

#699 Reedy "Rated-X" Sport Pack, Panasonic 3000 cells

ONLY \$59.99

ONLY \$64.99

Reedy "Spec 19 Quad-Mag Motor." Step up the power of your RTR with Reedy's Quad-Magnet "Spec 19" Motor! A great choice for the B4 RTR, the TC3 RTR, or any Ready-to-Run electric with a speed control rated for a 19-turn or less motor.

#513 Reedy Spec 19 "Quad-Mag" Motor

*A Division of Associated Electrics
3585 Cadillac Ave. Costa Mesa, CA 92626*

WIN AN OFNA YO-YO & AN RC CAR ACTION SUBSCRIPTION!

Do you have a winning idea? Share it. You could win a 6-month subscription (or an extension of your subscription) and an OFNA yo-yo. The monthly "Tip of the Month" winners will all be considered for a grand prize—an OFNA car kit. Send a sketch or photo to "Pit Tips," *RC Car Action*, 100 East Ridge, Ridgefield, CT 06877-4606 USA. Print your name and address clearly, or you won't win a thing. You may also email your tip to pitips@rcaraction.com. Sorry; we just can't acknowledge every tip or return the ones we don't use.



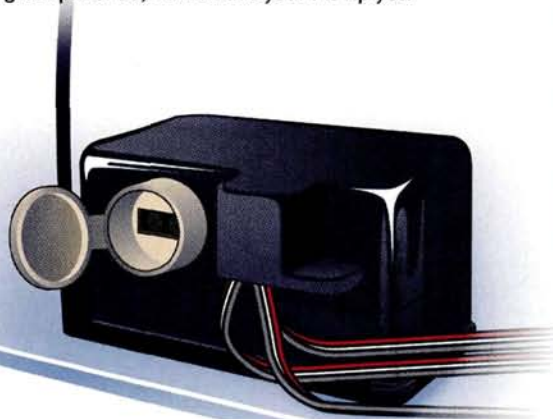
MANUAL MINDER

Being organized is always a good thing, so every time you get a new RC car, three-hole punch the instruction manual and put it in a three-ring binder. Do the same to any supplemental sheets (such as parts lists). If you race, photocopy your setup sheets, and put them in a separate section of the binder.
Mark Ward
Orange Park, FL



TIP OF THE YEAR

Congratulations to Scott Amarosso of Phoenix, AZ! His "Top Tip" from the July issue was selected as the "Tip of the Year." For his clever tip, Scott won an OFNA LD3 RTR sedan! Thanks go out to Scott for his tip and to OFNA for providing the great prize. So, do we have your Pit Tip yet?



EASY SYNTHESIZED RECEIVER ACCESS

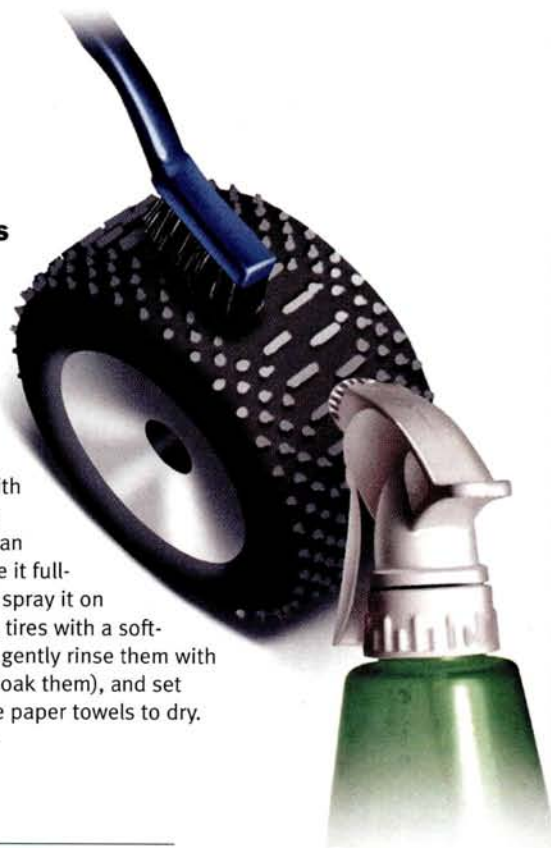
If your car uses a plastic box to protect the receiver and you have one of the new synthesized receivers, this tip is for you. Instead of disassembling the box whenever you need to change channels, install a hinged screw cover for easier access to the receiver dials. They are found in most hardware stores. Drill a hole into the receiver box that's large enough for the cover and so it lines up with the receiver dials, then glue it in place. When you need to change the setting on the receiver, just flip open the screw cover.

Scott Amarosso
Phoenix, AZ

TACKY TIRES

To keep your on- and off-road tires clean and as sticky as they were when they were new, clean them with Simple Green cleaner. You can dilute it or use it full-strength. Just spray it on and scrub the tires with a soft-bristle brush, gently rinse them with water (don't soak them), and set them on some paper towels to dry.

Sean Lafferty
Berlin, NH



SLOTTED SAVAGE

It can be a real pain to get the radio box lid on and off an HPI Savage because the front shock tower is partially in the way. Use a rotary tool with a cut-off wheel to slot the two front holes on the radio box lid; that will make it much easier to remove and install.

Dave Webster
Waconia, MN



SAFE WINDOW OPENINGS

It's common practice to cut out windows and holes for ventilation or to gain access into nitro bodies. The sharp edges of a Lexan body can deliver a nasty scratch or even cut a crew member's finger as a car speeds in and out of the pits. To keep your digits safe, line the openings with fuel line. Just slit one side of the tubing and press it onto the exposed edge, and use a bit of glue to secure it.

*Hank Hughes
Clinton, SC*



CUT-UP CRX

Hitec's Aggressor CRX transmitter and its Spectra module are an awesome combination. The only downside is that you can't change the transmitter's channel unless you remove the module. To solve this little dilemma, carefully use a sanding drum on a rotary tool, and notch the top of the case where it covers the two switches on the module. Of course, remove the module before you begin to cut and cover any openings with electrical tape to prevent plastic shavings from entering the transmitter.

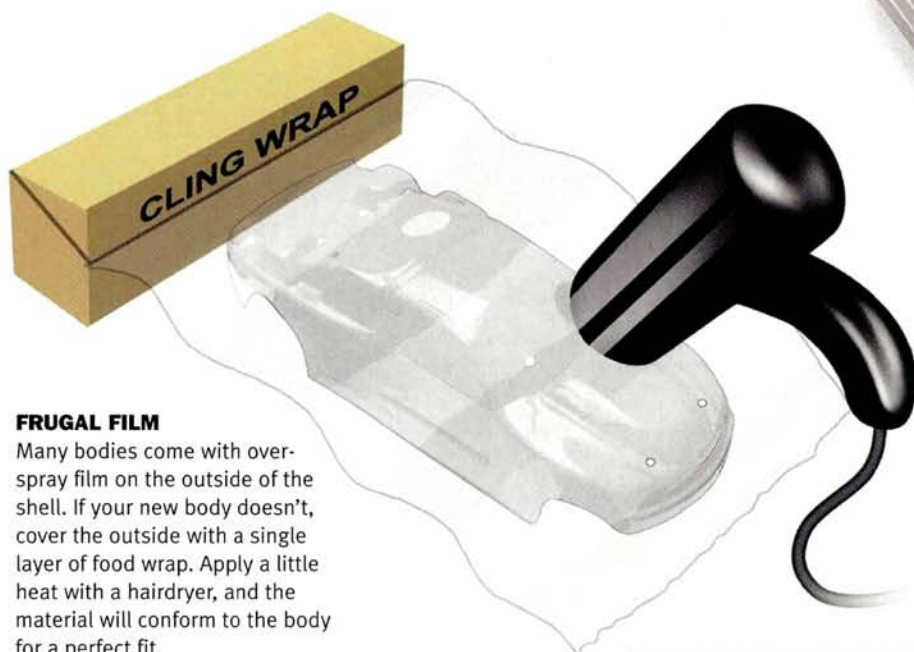
*Richard Paul
Richland, WA*



HOLD TIGHT

A fuel line popping off can end your day at the races. To prevent this, place a 1/2-inch section of heat-shrink tubing over the fuel line before you attach it. Then slip the fuel line and tubing onto the nipple and shrink it for a nice snug fit.

*Don Earnes
Newton, MA*



FRUGAL FILM

Many bodies come with over-spray film on the outside of the shell. If your new body doesn't, cover the outside with a single layer of food wrap. Apply a little heat with a hairdryer, and the material will conform to the body for a perfect fit.

*Josh Thompson
Atlanta, GA*

"Pit Tips" are submitted by readers and are screened for functionality, feasibility and safety but are not tested by Radio Control Car Action. Radio Control Car Action and the submitting authors are not responsible for personal injury or damage to models or tools resulting from readers' use of "Pit Tips." Readers are strongly encouraged to check their equipment's warranty before they perform any modifications.

Troubleshooting

YOU'VE GOT PROBLEMS? WE'VE GOT FIXES.

BY STEVE POND

NEED HELP? Send your "Troubleshooting" questions and comments to troubleshooting@airage.com, or mail them to "Troubleshooting," c/o RC Car Action, 100 East Ridge, Ridgefield, CT 06877-4606 USA.

Q FOAM FIX

My local track just started letting us run foam tires on our nitro touring cars. We run on asphalt, and the performance is so much better compared with when we ran rubber tires. My only problem is keeping the tires in one piece. Every weekend, I end up with at least one tire that has a chunk of foam missing. Is there something I'm doing wrong? Is there any way to prevent this?

Mark S. [email]



Tire-saver rings that come with most foam racing tires are made of relatively thick foil with a strong adhesive backing. These rings help prevent the tire from chunking when it comes in contact with a barrier or another car.

A Clipping a track barrier another car is all it takes to damage a foam tire. For all of the good things that foam tires bring to the table, such as more consistency and better overall handling, they don't hold up as well when you run them on a track that has tough barriers.

Avoiding the walls and other cars at the track is the best fix, but contact of some type is virtually inevitable when you race, so that will only take you so far. Many foam tire manufacturers include foil "tire-saver" rings with their tires. These aren't just for advertising the brand that you run; they're made to help protect the tires. The ring is usually constructed of a thick foil and backed with a relatively strong adhesive. When it's applied to the outer surface of the tire (where chunking usually occurs), the ring provides a thin layer of protection against abrasion damage. There's a limit to how much you can do to protect your tires, but using the tire-saver rings helps considerably.



A foam tire of any size can benefit from tire-saver rings, but they're usually used on the rear tires. Front tires "roll" onto their sidewalls a little more, so a front tire-saver ring may reduce traction unless the tires are really fresh.

REAL PERFORMANCE PRODUCTS!

T-Maxx/2.5-Maxx Steel Top Shaft

NEW



This precision machined **hardened** steel top shaft will fit all T-Maxx. Includes oversize ball bearing. RRP 8525

T-Maxx/2.5-Maxx FORWARD ONLY Steel Gear Kit

NEW



This kit contains a 26T **hardened** steel output gear, a forward drive hub adaptor, steel spacer and Pin. RRP 8586. **Hardened** aluminum version RRP 8585.

T-Maxx/2.5-Maxx Hardened Forward Primary Gear

Precision machined from solid steel and then **hardened**. RRP 8529. **Hardened** aluminum version RRP 8528.

NEW

www.robinsonracing.com

T-Maxx/2.5-Maxx Forward Primary and Reverse Gears

NEW



This kit contains a precision machined **hardened** steel primary forward gear, a **hardened** aluminum reverse gear and pin. RRP 8521

T-Maxx/2.5-Maxx Primary Reverse Gear

NEW



This gear is precision machined from solid aluminum and **hardened**. Includes pin. RRP 8522

MAKE NO COMPROMISES!

T/E-Maxx/2.5-Maxx Accessory Spurs



A wide range of spurs fit our Double-Disc Slipper Kits. Choose from machined Super-Tough plastic spurs in 66, 68, 70, 72, 74 and 76T sizes, RRP 82XX, or CNC machined steel spurs available in 65, 72 and 76T sizes, RRP 83XX. Small Clutch Plate/Gear Adaptor fits 65 thru 70T spurs. Large Clutch Plate/Gear Adaptor fits 72 thru 76T spurs.

T-Maxx/2.5-Maxx Lightened Spur And Double-Disc™ Slipper Kit



RRP's NEW line of Lightened Spur and Double-Disc Slipper Kits for Traxxas Nitro and T/E-Maxx/2.5-Maxx trucks are designed to improve performance and increase reliability. This combo incorporates a machined steel or Super-Tough plastic spur, a Vented Aluminum Clutch-Plate/Gear Adaptor, 2 Slipper Pads and Plates to deliver the adjustability you need and the increased performance that you demand. **Complete Slipper Kits** are available in the following sizes: RRP 8166 Slipper Kit with 66T Super-Tough plastic spur (Stock Size) for E-Maxx RRP 8172 Slipper Kit with 72T Super-Tough plastic spur for Traxxas Nitro RRP 8465 Slipper Kit with 65T Steel Spur for Traxxas Nitro RRP 8472 Slipper Kit with 72T Steel Spur (Stock Size) for T-Maxx Spurs, Clutch-Plate/Gear Adaptor and Slipper Pads also sold separately.

sponsored by



Q MOD MOTOR MAINTENANCE

I ran the stock motor in my Tamiya car for about six months before I switched to a modified motor. I picked up a D5 motor and a new DuraTrax speed control, and I installed them about a month ago. Holy #%\$! Was my car flying! It still runs much faster than it did with the standard motor, but it seems to be slowing down quite a bit from the speed I had when I first installed the motor. I'm new to this, and I don't have a local hobby shop. Why am I losing speed?

Matt Brawley, Seattle, WA

A It probably needs nothing more than a little regular motor maintenance to restore the kind of power and speed that you experienced with the newly installed hardware. Modified electric motors, especially high-end ones like the D5, are optimized for maximum power output (as you've already experienced). The flip side is that these motors require more frequent maintenance to sustain that performance. In addition to regular cleaning and basic maintenance, the motor brushes and commutator may need attention because they become worn the most quickly.

Motor brushes are about $\frac{3}{8}$ inch long (10mm) when they're new. They shouldn't be allowed to wear much below about $\frac{5}{16}$ inch (8mm). Once they are worn beyond that point, they've been in the motor a little too long, and the performance will start to suffer.

The commutator, which is the part of the motor with which the brushes make contact, can also be worn and contaminated. The commutator should be cleaned regularly and cut between every two or three brush changes. Cutting refreshes the surface of the commutator, restoring it to out-of-the-box condition. If you can make a road trip to a nearby hobby shop or find a local enthusiast who has a motor lathe, either may be able to help you. Trinity also has a service where it will professionally rebuild your motor for a fee, but it includes return shipping, so you might just have to pay to send the motor to them—(732) 635-1600; teamtrinity.com.



Cut the commutator and install new motor brushes to improve the performance of a well-used motor.

T/E-Maxx/2.5-Maxx Steel Diff Gear Set



T/E-Maxx/2.5-Maxx differential gear set, includes: 1 beveled pinion gear, 1 beveled spur gear, 4 re-usable stainless steel phillips head screws, 1 tube Associated Black Grease, and a shim kit for spider gears with 10 .003" shims. 2 sets needed per truck. RRP 8590

DON'T SETTLE FOR SECOND!



T-Maxx Vented Flywheels



Aluminum vented flywheels move air over clutch bell, improving performance and cooling. RRP 8551 Blue, RRP 8550 Natural Silver
NEW 2.5-Maxx Vented Flywheel, Blue Only RRP 8552.

T/E-Maxx/2.5-Maxx Replacement Pinion



This precision machined steel pinion fits RRP 8590 Diff Gear. RRP 8591

T-Maxx/2.5-Maxx Aluminum High Performance Brake Kit



New, lightweight aluminum high performance brake kit, includes bigger, more aggressive brake pads and steel backing plates. One piece vented rotor minimizes side-to-side wobble. Also fits newer T-Maxx. RRP 8562
Older style half shafts use Brake Kit RRP 8560.

www.robinsonracing.com

T-Maxx/2.5-Maxx Hardened Steel Clutchbells



CNC Machined from solid steel these bells are built to last. They take the 5x11 bearing (NOT included). Available in 19T, RRP 8119, 20T RRP 8120, 21T RRP 8121 and 23T RRP 8123.

ROBINSON RACING PRODUCTS

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Q SHAKE SOLVER

I run a Losi XXX-NT, and it's a great truck, but I always have this unusual problem with the rear wheels. After about two weekends of running, the wheels start to shake violently at high speeds. The tires are pretty worn at that point, so I usually install a new pair. I would like to use these tires for practice or just bombing around, but sometimes, they shake so badly that it's hard to drive the truck. I cut a few of the tires open to re-use the foam inserts and noticed a lot of dirt inside the rim. Does that much dirt come through the bead if there's a spot that isn't glued? Why does this only seem to happen with the rear tires?

Jonathan Vallen [email]

A Many stadium truck wheels have vent holes that allow air to flow into and out of the tires. It isn't uncommon for dirt to find its way through these vent holes, especially when you run on a loamy surface (lots of loose dirt). Dirt gets forced into the area inside the tire either by centrifugal force or by it getting sucked through the vent hole when the tires expand at higher speeds and draw air through the vents. If dirt accumulates around the vents, when air is drawn through them, a certain amount of dirt will get sucked into the tire. There isn't any way for the dirt to escape the vents, so as dirt accumulates, the more out-of-balance the tire becomes.

The next time you mount a new set of tires, use tape or spots of glue or silicone to seal the vent holes in the wheels, and then use a leather punch (or something similar) to make a couple of opposing vent holes in the center of the tire tread. This allows proper venting of the tires, and any dirt that gets inside the tire will be expelled through the vent holes that you created.



Plugging the vent holes with tape or sealant helps maintain the wheels' balance by preventing loose dirt from entering them. For best results, use a leather punch to make vent holes in the tire treads.

RC10-GT Steel Combo



Precision machined from solid steel, then hardened, this 65T spur and 15T bell combo will last and last. RRP 2365

RC10-GT Hardened Steel Idler Gear



Cut from solid steel stock, this RC10-GT gear is lightened and hardened for super quiet precision and extra long life. Black tranny grease included. RRP 2213

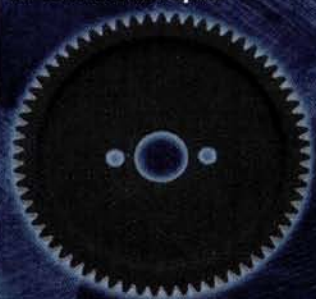
Associated Titanium Stealth Top Shaft



CNC Machined from solid titanium, this super hard, super light top shaft will fit any Stealth transmission. RRP 1512.

www.robinsonracing.com

RC-10GT 32 Pitch Spurs



Precision machined from heat-resistant, super tough plastic, these spurs mesh flawlessly with our Clutchbells. Available in 63T thru 67T, RRP 2263 - RRP 2267.

Hardened Diff Gear



Hard anodized, precision CNC machined aluminum diff gear. RRP 1513 RC10-GT

RC-10GT Hardened Steel Clutchbells



These steel Clutch Bells are CNC machined from solid steel then the teeth are machined on. This makes the part stronger with less gear "run out". Available in 14T thru 20T, 22T and 24T. RRP 22XX

DON'T SETTLE FOR SECOND!

TC3 Ultra 48 Pitch Spurs



Precision machined from heat-resistant plastic, these spurs mesh flawlessly with our pinions. Available in even numbers from 70T thru 80T, RRP 1670 - RRP 1680.



Q WHEELS WON'T LET GO
I have a Mugen MTX-3, and I love the car, but the weirdest thing happens with the wheels after I've installed them. When they're new, they slide on without any problem, but they're always difficult to remove and reinstall. I have to pry them off using both hands!
Brendon Welsch [email]



The stock wheel nuts of the MTX-3 (below left) pinch the wheel because they don't have a flange; install a flanged nut (below right and above) to reduce the pinching.



A I also have an MTX-3 and have had similar problems. The MTX-3 comes with standard nylon, locking, wheel nuts. The profile of the nut causes it to put a lot of pressure on the plastic wheel right around the hole where the axle passes through. This pinches the plastic under the wheel nut to the point at which the hole closes around the axle, making the wheels pretty difficult to remove. Avoid tightening the wheels nuts too much; the tighter you go, the more you will have this problem. A cheap fix is to buy new wheel nuts the next time you're at the hobby shop. I installed Tamiya wheel nuts, which have a large flange that distributes pressure more evenly and prevents pinching of the wheel. I haven't had any problems removing or installing the wheels since I switched. ■

TOOLBOX



Tamiya TRF Tools

The letters "TRF" have inspired many "oohs" and "aahs" as the trademark symbol of Tamiya's line of full-option cars. Now the TRF line includes a range of high-quality tools for the discriminating Tamiya fan and anyone who appreciates high-quality, specialty tools. The line includes screwdrivers, hex drivers, a setting board and a height gauge, not to mention the solid aluminum nut drivers shown here.

TRF Nut Drivers (5.5mm/7mm)—item nos. 53650/53651; \$23.50 each.

HPI Savage 21 Nitro Steel Combo



This new 52 tooth Spur and 14 tooth Clutch Bell are CNC machined from solid steel and then hardened for unmatched performance and durability.
RRP 7052

NEW

HPI Savage 21 Nitro Vented Flywheel



Aluminum vented flywheels move air over clutch bell, improving performance and cooling.
RRP 7000

NEW

Stealth Spurs



These precision machined spur gears are super quiet. They're available in 48P in 60T thru 96T sizes, and fit any Associated or HPI electric car or truck.
RRP 1860 thru RRP 1896.

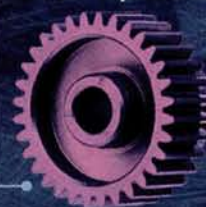
Electric Car And Truck Pinions:

48P Absolute Series Pinions



Super hard, lightened and cut with unmatched precision. Great with any spur, but with an Absolute spur, even on-off noise is gone!
Available in 48P in 16T thru 28T sizes. RRP 1416 - RRP 1428.

48P / 64P SuperLite Aluminum Pinions



They're lightened, hard coated and precision cut. Available in 48P in 16T thru 28T, and 64P in 24T thru 38T. RRP 30XX (48P) and RRP 31XX (64P). Only \$5.25

48P Hard Nickel Plated Steel Pinions



These precision cut gears have an extremely hard coating that makes them really last. Available in 12T thru 35T. RRP 1012 - RRP 1035

LUST LIST

by the RC Car Action team

PUT IN SOME OVERTIME. Mow some lawns. Shovel snow. Put your Yu-Gi-Oh cards on eBay. Heck, strap on a Girl Scout uniform and fend off some cookies. Pick a plan, 'cause you're gonna want some extra income to blow on RC's—it's Lust List time! Our annual collection of the hottest new gear and our current favorites is sure to have you looking for ways to put a little extra bank in your next ATM deposit envelope. Harvest the change from the couch, set up a shell game on the corner, create a "send me money" website... do whatever you gotta do!

50 OBJECTS OF





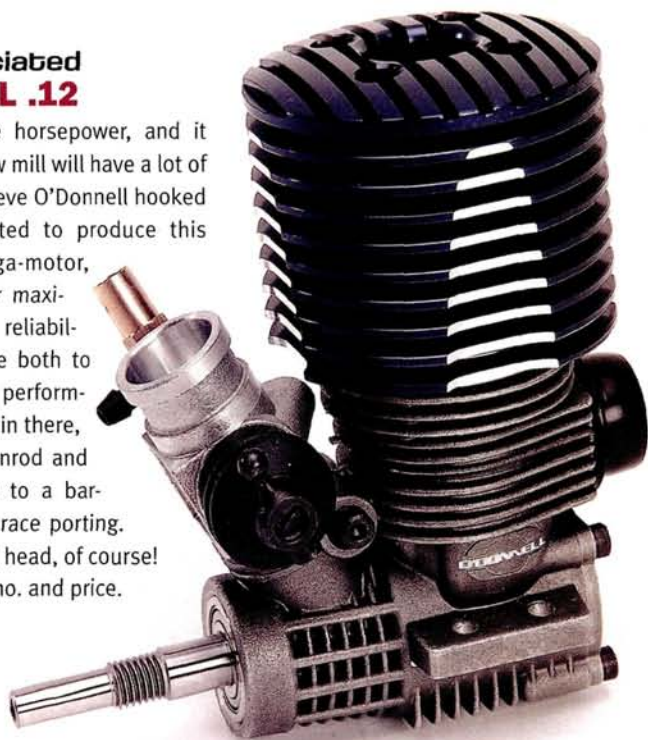
LRP

QUANTUM COMPETITION 2

Being waterproof is a nice touch, but the Quantum Competition 2 ESC's best feature is its Reactive Software. Thanks to some German engineering voodoo, it actually senses when you need low-frequency punch, high-frequency smoothness (or any variation in between), and it constantly adjusts the power flow to suit. Freaky and fast. For a full review, flip to page 220. **LXFB4**; \$200.

Team Associated O'DONNELL .12

Hmm; gotta love horsepower, and it looks like this new mill will have a lot of it. Engine guru Steve O'Donnell hooked up with Associated to produce this small-block mega-motor, which is built for maximum power and reliability; ya gotta have both to win races! All the performance features are in there, from an airfoil conrod and ABC construction to a bar-stock piston and race porting. Plus an O'Donnell head, of course! Too new for item no. and price.



RC DESIRE



XTM

RACING MAMMOTH

Long, low and wide: that's the Mammoth formula. The A-arm suspension is buggy-like, but it's built for truck duty. That goes for the super-spacious chassis, too, which gives the XTM .247 engine lots of elbow room to hustle the Big M up to 50mph—and then some, claims XTM. See the "First Look" on page 148. **145615**; \$400.



Trinity

D6 MODIFIED MOTOR

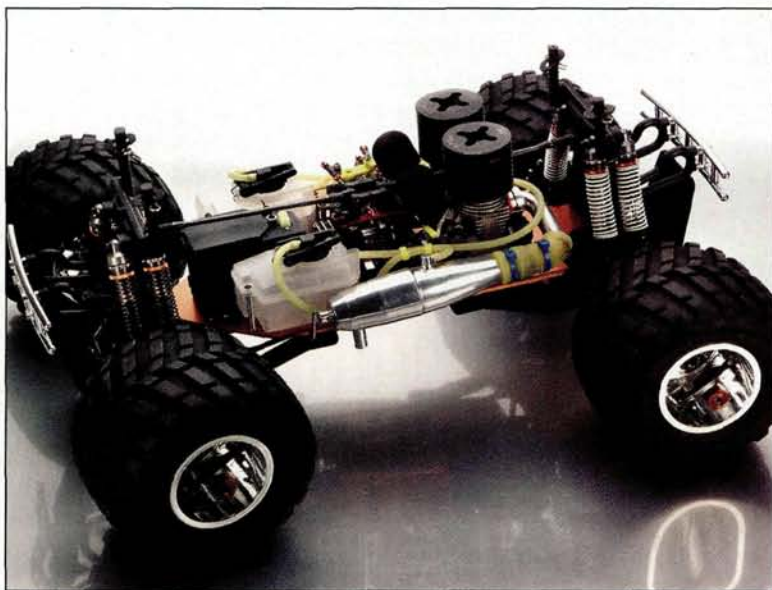
Who wouldn't want Trinity's new top-of-the-line D6 modified motor with its quad-magnet can (which ramps up the rpm) and flat-wire armature (for bringin' on the torque down low)? Look for innovative new features such as a modified armature design, an optional brush heat-sink system (to help keep the motor running cooler) and availability in flat-wire and standard round-wire configurations. Item no. varies with wind; \$50 to \$55.





Team Losi **TRIPLE-X4 GRAPHITE**

Team Losi is the number-one name in four-wheelers, and the gap between it and the rest just got a little wider now that the Triple-X4 Graphite is here. Swoopy new body, graphite everything, beefed-up front end, new suspension geometry, threaded shocks, titanium-nitride shafts and hinge pins—ooh, don't stop! **LOSA0015**; \$330.

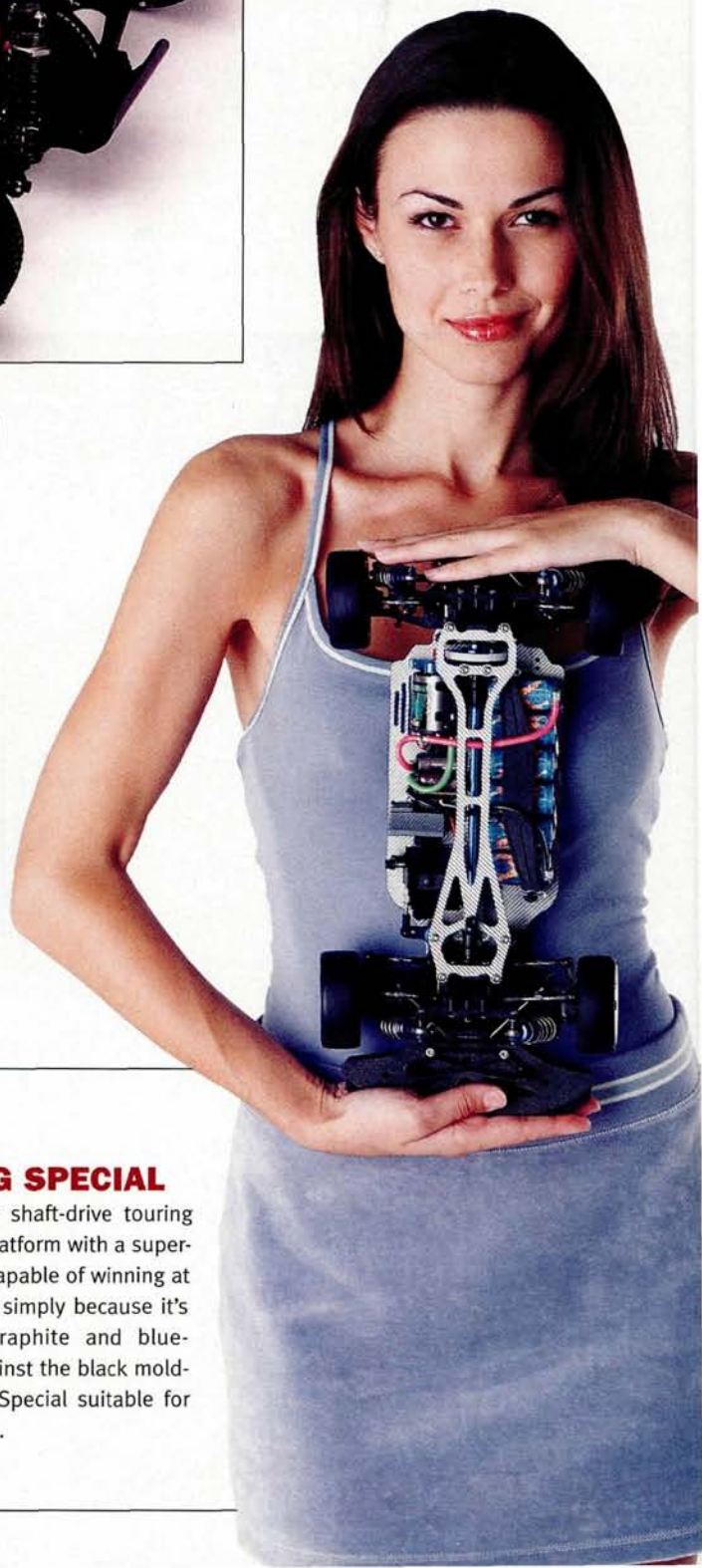


OFNA **TITAN TWIN RTR**

We've seen dual-engine trucks before but always as homebuilts or conversions (check out New Era). OFNA is the first to build a production truck with a pair of powerplants—Force .25s, no less! That's .50ci of total displacement, and you just gotta hear it to believe it. When the two engines resonate in raucous harmony, it sounds like the Everly Brothers channeling Slipknot. **34212**; approximately \$800.

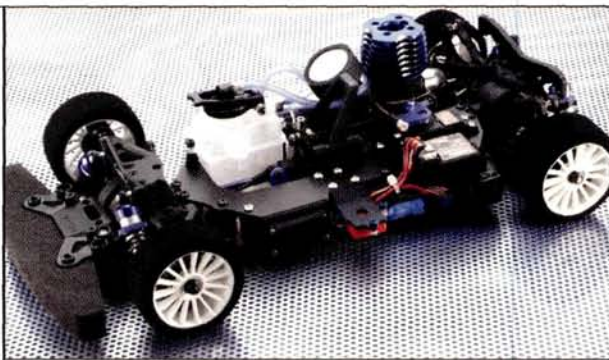
Yokomo **MR4-TC SD SSG SPECIAL**

Sure, Yokomo's first-ever shaft-drive touring car is a fully adjustable platform with a superslick drive train, and it's capable of winning at any level, but we want it simply because it's gorgeous. The silver graphite and blue-anodized touches set against the black molded parts make the SSG Special suitable for framing. **MRTC-SD1**; \$350.



Kyosho FW-05R

We've seen shaft drive move into some of RC's fastest electric tourers, and if the FW-05's performance is any indication, it may take over the nitro scene. Kyosho's new shaft-drive sedan is the flat-out fastest on-road race machine ever, and that says a lot, since the company's belt-driven V-One RR is a world-class machine. **31581B**; \$410.



Serpent 950R

Any ultimate RC list would be incomplete without an 1/8-scale on-roader, and no brand says "on-road" as loudly as Serpent. The 950R is the latest weapon from the snake-theme superpower, and it's an all-new machine that's lighter and lower than any previous Serpent. A narrower chassis, a laydown servo and new roll-center options increase the tuning options, and all the parts are of top quality. Too new for an item number; approximately \$700.



Traxxas T-MAXX 2.5

If we're in just-won-the-lottery fantasy mode, then don't put us down for one T-Maxx. We need, like, five. One to keep stock, one for a .70 conversion, another for an all-aluminum show truck, a fourth to lower for street action and one to set up for racing. That oughta cover it. The mighty Maxx is arguably the best nitro monster truck out there (2003 Car Action Truck of the Year, no less), and with its TRX 2.5 powerplant and tremendous aftermarket support, the Maxx doesn't go from mild to wild; it goes from wild to wilder. **4910**; \$420.



Tamiya TNX

Lighter, faster, stronger, tougher—and it has a .18 O.S. engine with electric start? Hellooo, TNX. Tamiya's next-step monster isn't a warmed-over Terra Crusher, it's a new truck with an entirely different high-performance personality. Check out the "First Drive" on page 104. **43508**; \$470.



New Era Models DUAL-ENGINE CONVERSION FOR HPI SAVAGE SERIES

If you put two engines in it, we'll lust for it—especially when the two engines are already in a truck we dig, such as HPI's Savage. New Era's kit includes everything you need to double your Savage's power and make it sound like a 125cc Moto GP racer. **HSV121**; \$250.

Sirio S21BK KANAI EDITION

That green head makes sense, since this engine is bound to make Hulk-like power! Sirio molded this mill with input from 1/8-scale off-road world champion (and Kyosho Inferno MP-7.5 designer) Yuichi Kanai. The super Sirio has a new 3-needle carb design, modified crank porting, a turbo head, an SG shaft and a 5-port sleeve setup for improved bottom-end drivability and screaming top-end power. Too new for item no. and price.



HTM Racing X-TERMINATOR DELUXE

We're already fans of the X-Terminator, so lusting for the Deluxe RTR version is a no-brainer. The "D" model looks sinister with its blacked-out wheels and graphite upper deck, while 5mm shock towers, a girder-like aluminum rear brace and an oversize head enhance performance and durability. XTM's .247 big-block is still in there, and the steering servo is a heavy-duty Hitec X-98MGHS. Gotta have that! **32372**; \$500.





O.S. Engines .21 VZ-B

Take away reliability, and suddenly horsepower doesn't matter so much—but all the better if your buggy's engine can deliver tire-shredding torque and still start and idle like a Camry. That's the sort of performance the O.S. VZ-B delivers, thanks to its hard-chrome sleeve, 7075 duralumin conrod, new 20L carb and O.S. Engine's legendary rep for great quality and precision. **13886**; \$299.



Epic MONSTER METAL GP3300 VIS-MATCHED TEAM PACK

The shrink-wrap may look as if it was designed by Quiet Riot, but make no mistake: these striped cells are the capacity kings and have voltage to spare. Punch that lasts—what every racer needs! We'll take Trinity's best, zapped, voltage-enhanced, computer-matched version, please. **EPO015**; \$90.



Mugen MBX-5

In a world of full-race, performance-first kit buggies, Mugen currently holds the title of most lust-worthy with the MBX-5. It's built to race with all the must-have features demanded by competition. Laydown steering servo, milled chassis, overdriven drive train, ground brake discs ... it's a long list that's summed up by one very short word: fast. **MBX5**; \$600.





Trinity/Team Magic **G4 PRO**

Trinity's top drivers worked closely with Team Magic to produce their vision of the ultimate competition nitro tourer. The car is built around the goal of an ultra-low center of gravity, and it has laydown steering and throttle servos (that's a first), a low-profile fuel tank and many other tweaks aimed at keeping the car's components low, low, low. Simplified maintenance was also a goal, and the G4's easy-out diffs are a huge plus. Add top-shelf materials and build quality, and the G4 is a lust-worthy race ride. **502061; \$400.**

Team Orion **V2 MODIFIED**

Will Orion's innovative, angled, cylindrical brush technology really provide superior power? Only the dyno knows, but the concept sure seems right—and looks killer! The machined-aluminum, beehive-like endbell should run extra cool, and Orion's usual hot-mod features including pattern-winding, epoxy-balancing and the latest high-power magnets are standard. Item numbers depend on wind; **\$95.**



New Era Models **NITRO CHOPPER**

Must we explain our lust for this bike? With a skinny tire up front, a fat foam slick in the back and wheelie bars out to there, New Era's dragger exudes quartermile performance and chopper style. And the nitro engine blasts through an open pipe like any chopper should! **NDC101; \$500.**



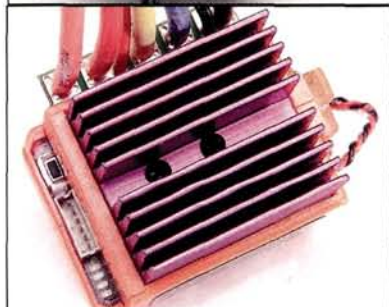
Team Associated **MONSTER GT**

When Associated builds a monster truck, everyone pays attention. Thunder Tiger big-block power, huge tires, reverse capability, aluminum-girder chassis and 8-shock long-travel suspension? Sign us up. **20500; \$500.**



Competition Electronics **TURBO 35 GFX**

Check out the fastest electric guys' pit spaces, and you'll probably find Competition Electronics chargers (plus lots of brushes and a comm lathe). The GFX is the latest and greatest battery filler-upper, and short of doing your laundry, it does it all. The backlit display can show charge and discharge curves, a rotary dial makes it easy to navigate functions, all functions are easily programmable, a 0.5 to 35A discharger is built in, and it can run motors at up to 20 amps. The GFX is a do-it-all charging/discharging battery-tuning station and power system. Not cheap but the best. **3760; \$450.**



Novak **SUPER SPORT BRUSHLESS MOTOR SYSTEM**

We'll take a Super Sport system to give high-performance/no-maintenance power to our 4-7 cell, single-motor projects, but the setup we're really lusty for is the soon-to-be released HV-Maxx. It replaces the traxxas E-Maxx's dual 550 motors with a single brushless powerhouse, and Novak's custom controller is specially designed for 12-cell duty. Pow! **Super Sport motor/ESC combo 3005; \$250; HV-Maxx motor/ESC combo; 3020; pricing to be announced.**



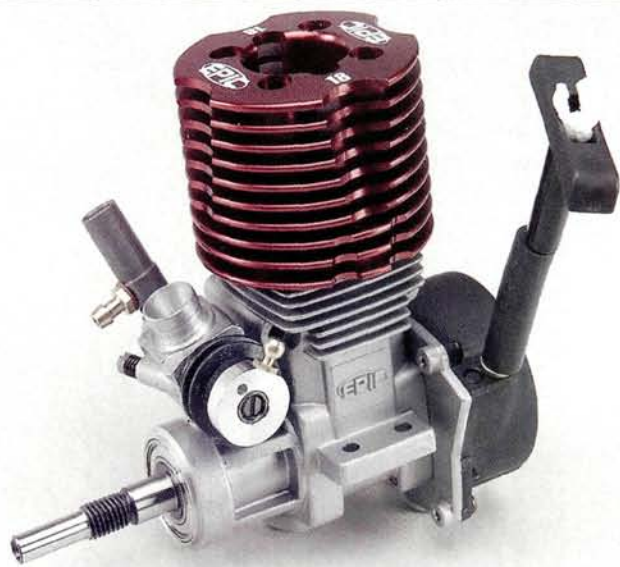
Team Losi **Mini-T**

It isn't often that we get to see a brand-new RC category spring to life out of nowhere, but we see it happen right now, as genuine off-roadability meets mini-RC with Team Losi's Mini-T. The 1/18-scale version of the Triple-XT racer has all the track-ready features of the "big" truck, right down to long-arm suspension, a 3-gear tranny and soft tires with foam inserts. And it's RTR, so you don't have to search around for little electronic bits to finish it! **LOSBo200; \$150.**



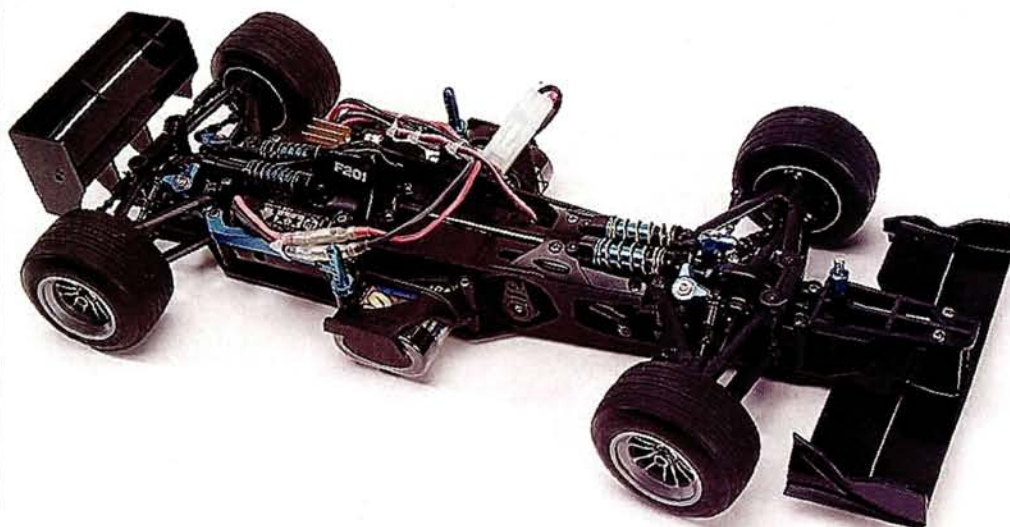
Pro-Line **40 SERIES SPINNERS**

Your Escalade isn't truly pimpin' until it has a set of spinners on it, and that includes your RC Escalade now that Pro-Line's beautifully machined, ball-bearing spinners are here. They bolt up to 40-Series hoops and look especially good on Pro-Line's new Mambo wheel. Bouncin' on 24s? That's played. You gotta be bouncin' on 40s! **6026-00 (2-pack); price to be announced.**



Epic **BIG-BORE .18**

If your monster's engine is getting tired, Epic's "big-bore" mill will definitely bring it back to life. The short-stroke, high-rpm small-block drops into any chassis designed for a pull-start .12 or .15, and there are plenty of performance features: aluminum, 2-needle slide or rotary carburetor, turbo crank, oversize heat-sink head and a standard plug, and Epic claims 1.8hp at 39,000rpm. We also dig the included "engine bag." **EPI800; \$200.**



Tamiya F201 FULL OPTION

We're already big fans of Tamiya's four-wheel-drive open-wheeler, so the full-option version easily made the Lust List cut. The shock bodies, ball-bearing rocker arms, body mounts, chassis brace and front swaybar plate are all carved out of aluminum, and thicker, lower suspension arms increase durability. Does F1 get any better? Too new for item number and price.



Pro-Line POWERSTROKE SHOCK SYSTEM

We haven't seen a major breakthrough in shock technology since Kyosho first put oil into a damper, but Pro-Line certainly made up for lost time with the PowerStroke system. The un-sprung By-Pass shock does all the damping and is internally valved to provide progressively firmer damping as the shock reaches its travel limit. The other boinger carries a dual-rate spring with travel limiter, and both work in concert on your Traxxas Maxx; each corner gets a By-Pass and a coil-over shock. The PowerStroke system is heavy-duty, too, with oversize bodies and 3.5mm shafts. Real monster stuff! **6025-00**; price to be announced.

Team Losi TRIPLE-X KINWALD EDITION 2

We've all wondered how Team Losi would counter Associated's B4. Here's the answer: KE2. In addition to the usual Kinwald upgrades (tin-nitride shafts and hinge pins, threaded shocks, graphite everything), the new K-car gets some big chassis changes. The tranny is lower, there are new mounting positions for the hub carriers, and the drive-axle/diff-outdrive geometry has been tweaked for nearly zero binding. Look for a major 2WD battle at the IFMAR Off-Road Worlds! **LOSA0030**; \$269.

Tamiya KNIGHT HAULER

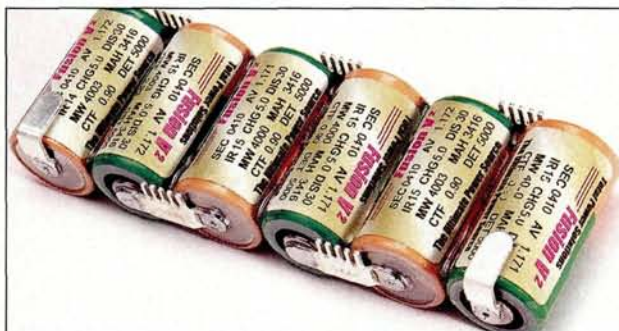
Sorry; no relation to Michael Knight of Knight Rider fame, but that only makes Tamiya's latest big rig all the cooler. We're lusting for the full electronic version with sound and motion effects. The cab shakes as the "engine" starts, the air brakes hiss, and the engine revs up as the Knight Hauler moves out. Totally trick! **56314**; \$400 (standard kit).





OFNA 9.5 VIOLATOR

What if you put wide, monster-style arms on an 1/8-scale buggy? OFNA answers that question with the Violator, whose long arms violate ROAR width rules (like we care) but put down a major footprint and give this big buggy unshakable traction and a serious stance. Factor in the usual 9.5 features such as a Force .25 engine and rugged pivot-ball suspension, and you'll have a serious nitro thrasher; approximately \$500.



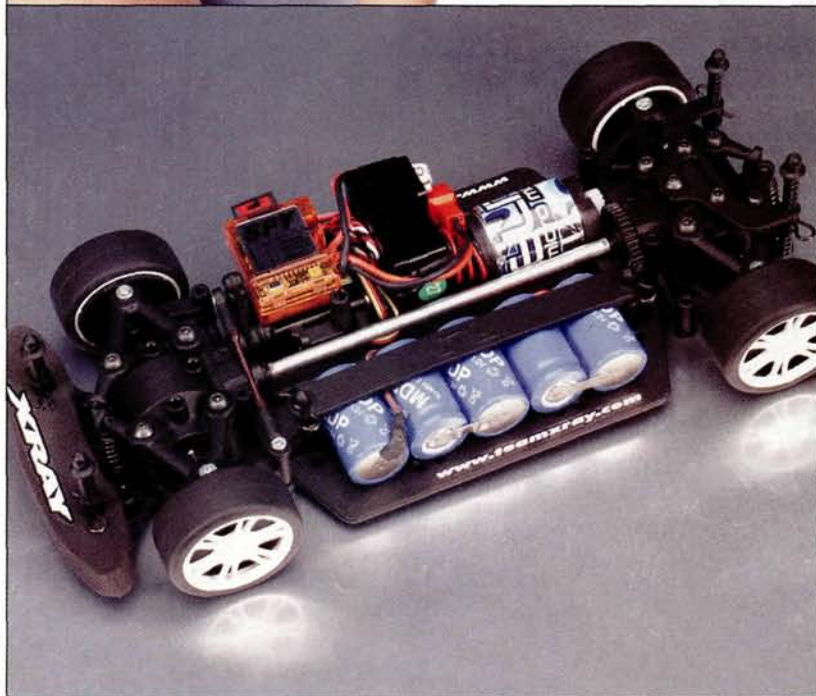
Total Power Solutions FUSION V2 POWER MODULE

Total Power Solutions' voltage-enhanced GP3300 cells pump out some impressive numbers, but so do a lot of matchers' GP3300 cells. We're into these Fusion packs because they're fully assembled (woo-hoo!) with glued cells and clever battery bars that are actually tiny heatsinks. According to Total Power Solutions, the packs are built to NASA and military specs using a patent-pending process that dramatically reduces heating. Since the packs are heated less during assembly and run cooler thanks to their heatsinks, you get longer-lasting punch and maximum run time. We'll take a Team pack, please; "Race" and "Club" versions are also available. **GP3300TEAM**; \$80.



XRAY M18

Anybody out there working on a new 1/18-scale design? Shelf it; there's no point trying to compete with the M18. True independent suspension, shaft-driven 4WD, total tunability and XRAY precision make this the ultimate road-going micro machine. And we want one; approximately \$100.



MRC SUPER BRAIN 969

MRC's Super Brain series has been popular since the first model brought microprocessor-controlled peak charging to the low-dough market, and the latest Brain is MRC's best. The 969 has an LCD display to help you keep tabs on dual charging outputs, which can be used to charge two packs simultaneously—even if they're completely different types of cells! Adjustable voltage threshold and complete NiMH compatibility with an independent, included AC power supply make the 969 extra versatile. If it's rechargeable, the 969 can juice it up. **RB969**; \$100.

ROCK 'N' ROLL RADIOS

**Futaba
2PL**

Wow! Dual-rate steering and throttle endpoints, LCD display and 10-model memory—for less than \$100? Incredible! Beginners and low-budget guys: you'll never have to use a lame no-frills radio again. **2PL**; \$95 (with receiver and one S3003 servo).

**Airtronics
M8**

The M8 is chosen by more pro drivers than any other radio and has been our "Readers' Choice" winner since it came out. We'd be happy with the standard model, but this is the Lust List, so we want the version with the blue backlight and the cobalt LED. Hand it over. **90290TX**; \$260.

**Hitec
CRX**

Here's a great value in a 3-channel FM system. The CRX has 20-model memory (yes, 20!), ABS, adjustable wheel tension, an alphanumeric/graphic display and all the pro-radio features you could ask for (endpoints, expo, mixing, timer ...). It's easily Hitec's best radio ever and an easy pick for the Lust List. **127271**; \$220.

**KO Propo
EX-10 HELIOS**

It's sleek, sexy and puts out a strong signal. We're of course talking of KO Propo's newest top-echelon radio—the EX-10 Helios. The feature-filled flagship has a 30-percent-faster processor than its predecessor, and it comes with a 25-percent-smaller receiver. A slick interface is actuated via a unique jog dial that allows you to scroll through the radio menus with ease. KO also offers an optional PC interface to further enhance your driving experience; it allows you to alter radio settings through your computer and to set up an infinite number of car-model memory settings. **Item no. KOP80066 (75MHz)**; \$350.

**JR Racing
XS3**

There's a lot to like here: comfortable and stylish design; easy-to-navigate menus; adjustable exponential, endpoints and dual rate and 3-channel operation. But we love the XS3 most for what it doesn't have—crystals. The transmitter and receiver synthesize any channel you need, so you'll never be stuck at the losing end of a channel conflict again. **JRP317275**; \$250.



SKY STUFF


Hobbico
NEXSTAR TRAINER

Lots of small electric RTR planes are out there, but getting started in .46 size nitro-burning aircraft has always been a significant step up. That step is a lot smaller now! Hobbico's NexSTAR plugs together and even includes RealFlight simulator software that lets you fly your NexSTAR on your PC, so you get crashing out of your system virtually. But here's the best part: to make flying truly goof-proof, the NexSTAR has an auto-correct flight function that automatically rights the plane for you if you get in over your head. Release the controls, and the plane's onboard system takes over to return the plane to level flight. Price to be announced.

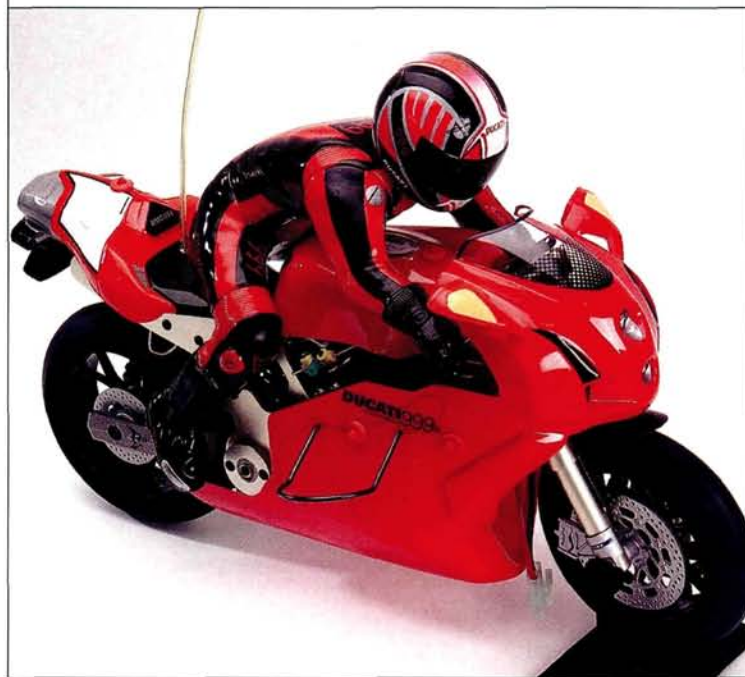

Hangar 9
46-PERCENT TOC ULTIMATE

From trainers, we go directly to the big stuff. This factory-built biplane is nearly 1/2 scale (with a wingspan of more than 8 feet!) And if you imagine a lumbering giant, guess again. Hangar 9's mega-plane is fully aerobatic and tears up the sky like Rodan. Check out the video at modelairplanenews.com! **HAN1100**; \$1,700.

Thunder Tiger
DUCATI 999R TESTASTRETTA

If you're a motorcycle guy, you're a Ducati guy. And if you're an RC guy, this is the bike to get: Thunder Tiger's 999R Testastretta. The officially licensed 2-wheeler arrives RTR with radio gear (including ESC) and a painted dude, so it's ready to rip. Faux disc brakes, bash bars, full suspension and a real chain drive are all stock. Gotta have one!

6528-F; approximately \$350.

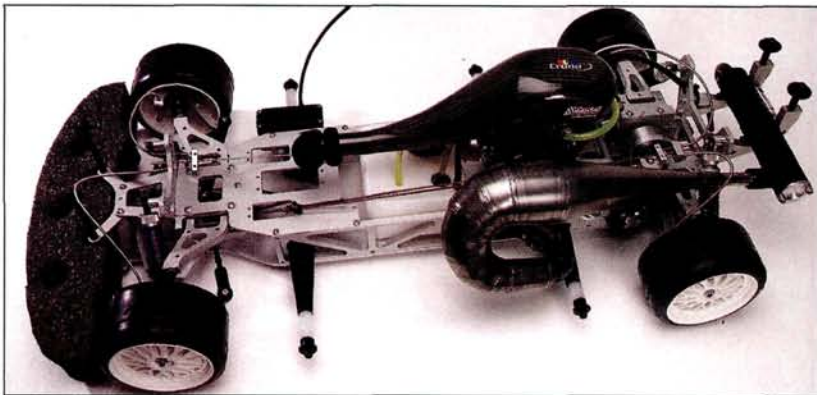

Tamiya
TB EVOLUTION III SURIKARN LIMITED

Two super-shaft cars on the Lust List; why not? The Surikarn Limited is another full-race dream machine that we could just as happily park on a shelf as race it (as sinful as that may be). All that red-anodized aluminum screams RC sex appeal, and we can't help but love any no-holds-barred racer from Tamiya. **49283**; \$430.



Kyosho MAD FORCE RCX EDITION

We've liked Kyosho's straight-axle, 3-speed super truck since it first came out, but it's the RCX version we lust for. It has 8 aluminum Turbo shocks, "hard" chassis plates, universal-joint drive shafts and (drumroll, please) an O.S. Engines RG-X .21 engine! Woo-hoo! **31222B**; \$580.



SVM CRONO MK6

It's our "Lust List," and if we're going to put a 1/5-scale car on it, it's gotta be the best. The MK6 is an easy pick with its irresistible works-looking pipe, curvaceous carbon-fiber intake and machined Ergal-aluminum construction. Nearly 5hp's worth of Zenoah power is guaranteed to get this beast up to illegal speeds—good thing each wheel has its own disc brake! Too new for an item number; approximately \$1,800.



Tamiya TWIN DETONATOR

Sure, we lust for the crazy-exotic stuff just as everybody else does, but we can't keep away from the fun-mobiles—Tamiya's Twin Detonator, for example. Forget racing and all the tweaking that goes with it; this dual-motor, low-maintenance monster is all about chasing cats, shredding the backyard and generally tearing up the town. It's bombproof and a blast to drive. And it looks good, too! **Item no. 58309**; \$170.

Team Associated B4 AND T4

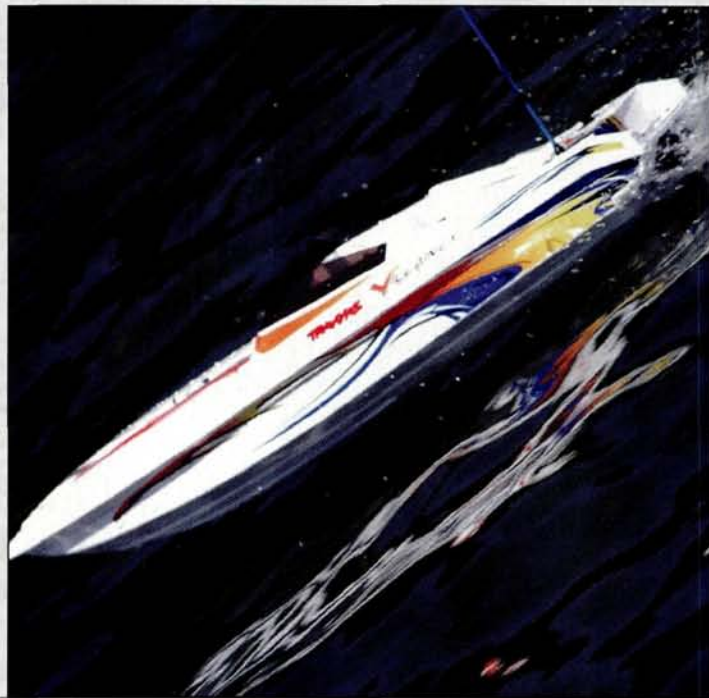
Who can resist the latest generation Associated buggy and truck? Not us, especially with their new suspension geometry, super-slammed chassis, bigger ball diffs and dual-disc slipper clutches—plus Pro-Line tires and bodies and all the Team features we've come to love. When it's opening day of the off-road season, the B4 and T4 are a powerful pair. **RC10B4 Team kit**—item no. 9034; \$190 **RC10T4 Team kit**—7020; \$210.



THE WET SET


**CEN
AQUA JET**

Simple, inexpensive and fast—that's why we like the Aqua Jet. And its good looks don't hurt, either! The direct-drive prop system couldn't be simpler, and the water-cooled NX-16 engine helps the Aqua Jet live up to the "jet" in its name. It's fast! Prefer battery power? There's an electric version, too; \$368.


**TRAXXAS
VILLAIN EX**

E-Maxx dual-550 power in a boat with a water-cooled, Novak-built ESC pumping the power of 12 cells? That's gotta be fast. Traxxas claims more than 20mph from the truck-style setup! That might not sound impressive on pavement, but for an on-the-water speed, that's ballistic—and unheard of in an RTR electric boat. **1502; \$320.**

**Pro Boat
1/8-SCALE MISS BUDWEISER**

This has to be the ultimate RTR boat. It's more than 3 feet long, with a fiberglass hull, a 23cc gasoline engine, JR Racing XR3i FM radio gear and licensed graphics. And it will hit 35mph! We don't care how hardcore you are about cars, this bad boy will turn anyone into a boat guy. **PRB2250; \$1,200**



SOURCES

AIRTRONICS (714) 978-1895; airtronics.net.

CEN/GENKA TRADING CORP. (714) 792-1923; cenracing.com.

COMPETITION ELECTRONICS (815) 874-8001; competitionelectronics.com.

EPIC DISTRIBUTED BY TRINITY PRODUCTS INC. (732) 635-1600; teamtrinity.com.

FUSION BATTERIES fusionbatteries.com.

FUTABA distributed by Great Planes (217) 398-6300; (800) 682-8948; futaba-rc.com.

HANGAR 9 distributed by Horizon Hobby Inc. (800) 338-4639; horizonhobby.com.

HITEC RCD INC. (858) 748-6948; hitecrd.com.

HOBBICO distributed by Great Planes (800) 682-8948; hobbico.com.

HPI RACING (949) 753-1099; hpiracing.com.

JR RACING distributed by Horizon Hobby (217) 355-9511; horizonhobby.com.

LRP distributed by Team Associated (714) 850-9342; teamassociated.com.

MODEL RECTIFIER CORP. (MRC) (732) 225-2100; modelrectifier.com.

MUGEN USA (949) 707-5607; mugenracing.com.

NEW ERA MODELS (603) 888-4453; neweramodels.com.

NOVAK ELECTRONICS INC. (949) 833-8873; teamnovak.com.

OFNA RACING (949) 586-2910; ofna.com.

PRO BOAT distributed by Horizon Hobby (800) 338-4639; horizonhobby.com.

PRO-LINE (909) 849-9781; pro-lineracing.com.

SIRIO distributed exclusively by Trinity Products Inc. (732) 635-1600; teamtrinity.com.

TAMIYA AMERICA INC. (800) 826-4922; tamiyausa.com.

TEAM ASSOCIATED (714) 850-9342; teamassociated.com; rc10.com.

TEAM LOSI distributed by Horizon Hobby Inc. (800) 338-4639; teamlosi.com; horizonhobby.com.

TEAM ORION INC. (714) 694-2812; team-orion.com.

TRAXXAS CORP. (972) 265-8000; traxxas.com.

TRINITY PRODUCTS INC. (732) 635-1600; teamtrinity.com.

XRAY distributed by Serpent USA (305) 639-9665; teamxray.com.

XTM RACING distributed by Global Hobby Distributors (714) 964-0827; xtm.globalhobby.com.

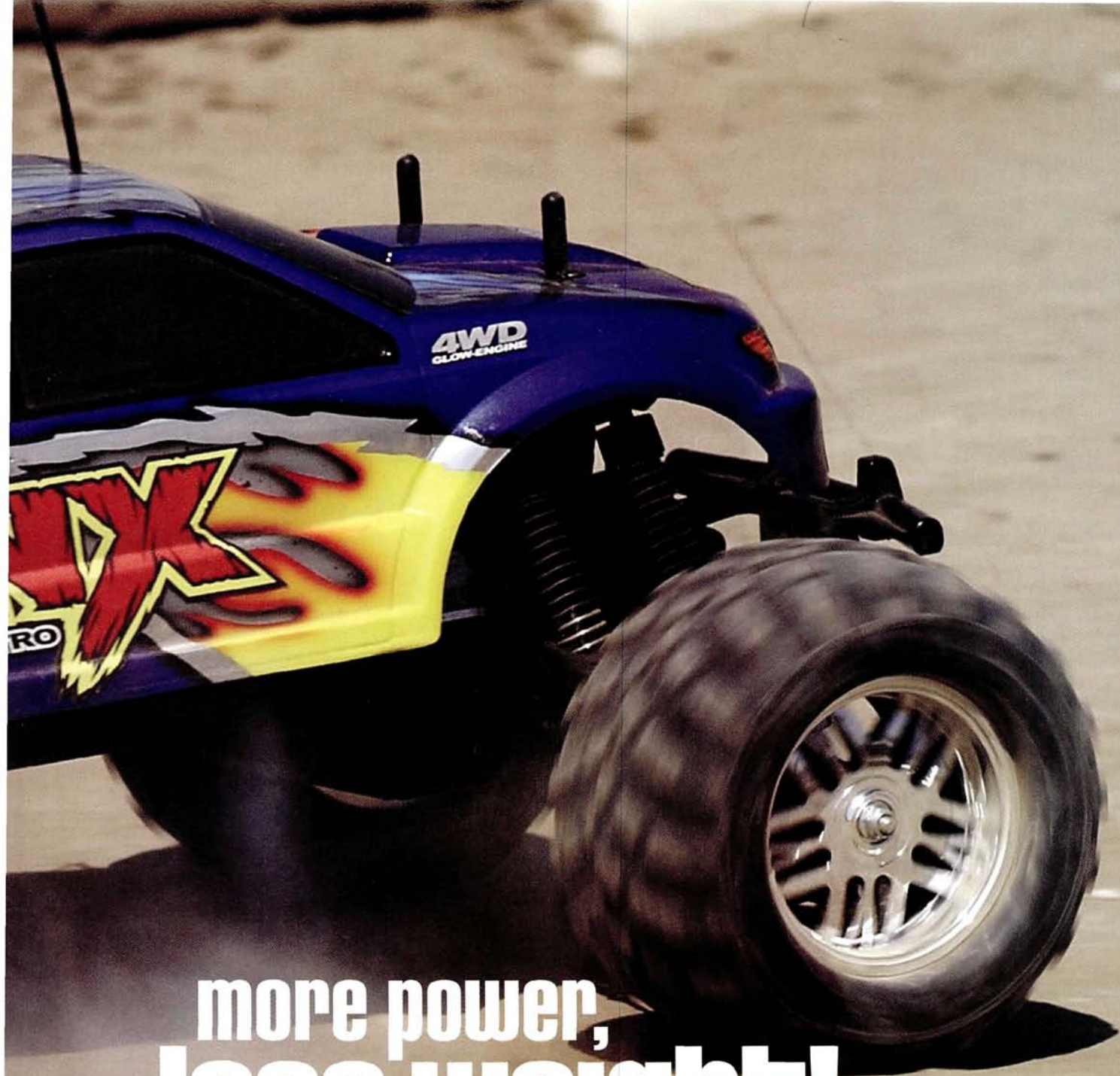
YOKOMO USA (949) 252-8663; yokomousa.com.

by George M. Gonzalez

Think of Tamiya's new TNX as the Terra Crusher's lighter, faster, more performance-oriented cousin. Thanks to a massive reduction in rotating weight and a more powerful, O.S.-built .18 engine, the TNX should easily eclipse the performance of the Terra Crusher. The new truck should also be a tougher competitor on the track now that the reversing system has been replaced by a simpler, lighter forward/brake drive train (with 2-speed, of course), and the chassis is now a single aluminum plate in place of the Terra Crusher's hybrid aluminum/plastic setup. Here's the best part: although the TNX seen here is a preproduction truck, the guys at Tamiya USA said it represents the finished product well enough for us to take the wheel and get some exclusive "First Drive" notes. You saw it here first!



TAMIYA TNX



more power,
less weight!

INCLUDED ACCESSORIES

TAMIYA PROSPEC GP RADIO SYSTEM

The TNX's 2-channel AM radio system has a comfortable grip and the usual steering and throttle trim adjustments. A steering dual-rate function and charge jack are added bonuses. A standard-duty Tamiya TP-S3003 servo handles the throttle and brake duties, and a new TP-S3005 high-torque servo with more than 80 oz.-in. of torque swings the steering bellcranks.

ELECTRIC STARTING

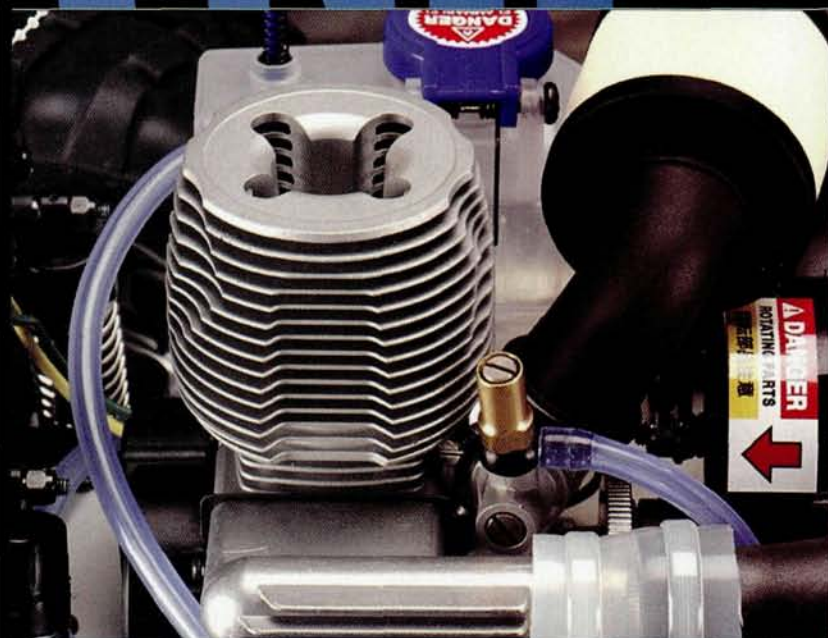
Tamiya's electric engine-starting system fires up the engine with less hassle. The glow-plug wire and connector that heats the glow plug has

been omitted, so you'll need to supply a glow starter to start the engine. According to Tamiya, the glow-plug wire that was included with the Terra Crusher was easily damaged, and most drivers prefer using a separate glow starter.

TOOLS AND ACCESSORIES

A glow-plug wrench, basic L-shape hex wrenches and extra air-filter elements will also be included—along with detailed instructions and a quick-start guide. The TNX might also include a bonus pack that comes with liquid thread-lock, air-filter oil and various extra parts—similar to the bonus pack that was included with the Terra Crusher—but the details have yet to be finalized, so don't quote us on this.

Photos by Jason Sarris & George M. Gonzalez



Engine by O.S.

The TNX comes equipped with a new Tamiya FS-18RS powerplant. The new O.S. engine was built specifically for the TNX. According to Tamiya, the new FS-18RS is a true racing engine that can run fuel with a nitro content of up to 40 percent. The engine features a high-performance piston and sleeve, 2-needle slide carb, large 15-fin heat-sink head, large volume air filter, light-weight flywheel, aluminum 2-shoe clutch and a composite 2-chamber tuned pipe. Tamiya's reliable and easy-to-use electric engine starting system returns on the TNX.



Fast forward, no reverse

The TNX features a lighter, more compact, forward-only transmission with a revised auto-shifting 2-speed mechanism. Omitting the reverse capabilities removes more than eight ounces of rotating weight from the drive train—and we all know how important rotating weight is. The transmission housing is reinforced with webbing to make it as rigid as possible.



C-hub suspension

Below: the TNX has a heavy-duty C-hub suspension with upper and lower suspension arms. The suspension arms pivot on over-size hinge pins for extra security, and eight plastic-body shocks provide the damping. Check out the stout-looking steering-knuckle arm and 14mm aluminum hex-hub adaptor that accepts wheels designed for the T-Maxx, Savage 25 and Monster GT.





One-piece chassis

A 3mm-thick, aluminum flat-plate chassis with radiused sides increases rigidity and spans the distance between the front and rear bulkheads. It's stronger yet much lighter than the half-plastic/half-aluminum Terra Crusher chassis. The Terra Crusher's large-capacity 150cc fuel tank is carried over to the TNX.

As you can see, the chassis looks uncluttered, which should make the truck easy to clean and maintain.

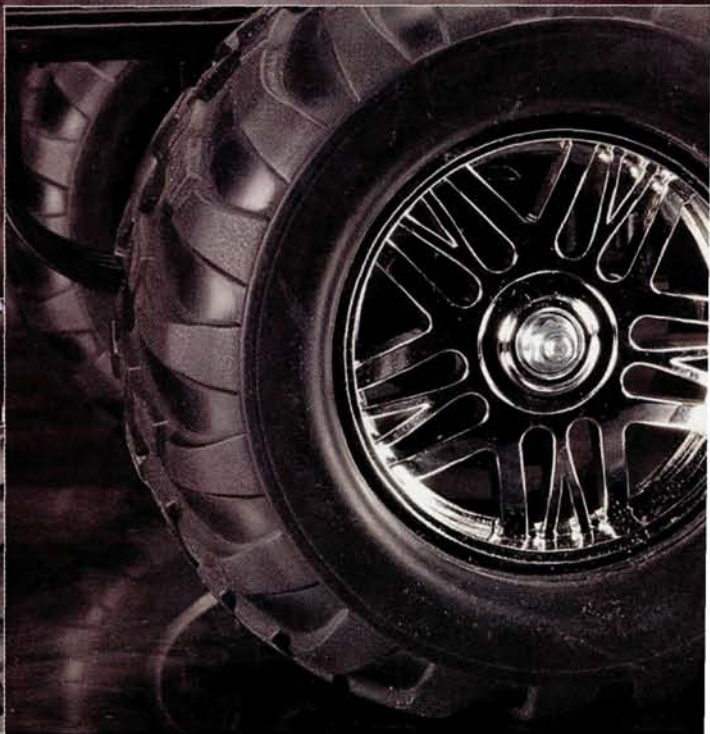
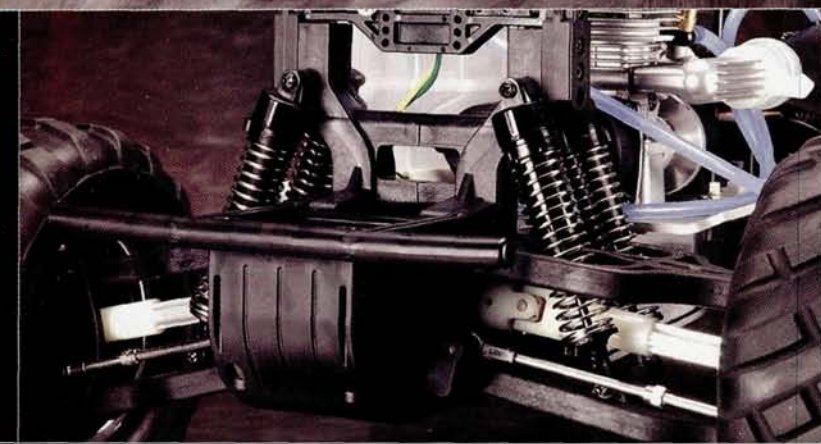
According to Tamiya, the TNX is 3.5 pounds lighter than the Terra Crusher. It shows!

New shoes

Below: the TNX rides on a new set of all-terrain tires that are noticeably smaller than the Terra Crusher's, and approximately the same diameter as a stock T-Maxx tire. The tires are molded from a medium-soft compound and have firm foam inserts installed to keep sidewall flex to a minimum. The new setup is much lighter and reduces rotating weight considerably. In fact, much of the TNX's 3.5-pound weight savings comes from its wheels and tires.

The TNX diet

Below: this may look like the Terra Crusher's suspension, but it isn't. Tamiya's engineers tweaked the molds to make the suspension arms, shock towers, bulkheads, body mounts and posts and the bumper/skid-plates lighter without sacrificing strength. Bulletproof-plastic universal axles with aluminum sliders are carried over to the TNX. The new lighter suspension components can be bolted onto the Terra Crusher if you own one and would like to put it on a diet.





WE DRIVE IT

IT'S FAST!

I was caught off-guard when I first pegged the throttle; the TNX accelerates like a nitro touring car and pulls wheelies on demand when you run it on a high-traction surfaces, such as asphalt or cement. If you squeeze the trigger too fast, the truck will flip over backwards onto its lid. According to Tamiya, the FS-18RS engine has a claimed power output of nearly 2hp, and it shows every time you grab a handful of throttle.

The 2-speed tranny shifts very smoothly and positively thanks to the shoe-type clutch mechanism, and the shift point is completely adjustable. Top speed seemed right up there with fast modified monster trucks, yet engine temps never exceeded 220 degrees, even after several back-to-back tanks of high-speed driving.

... AND IT HANDLES

The stock tires are most suitable for driving on asphalt, grass, gravel and soft dirt, which are the most common surfaces found around the house or backyard. They will also work decently at the track, but most racers will probably install tires that work best under specific conditions. We installed a set of Pro-Line Maxx Masher tires and Velocity

wheels for the track testing. Our preproduction sample was equipped with Tamiya 1000WT shock fluid, which is approximately the same as 80WT shock fluid.

The tire and suspension setup seemed well-suited to the bumpy and slippery track. The TNX carved a tight line around the track, and the term "push" never entered my mind. The high-torque steering servo easily swung the big meats around, and the truck corners very tightly both on- and off-power.

SUPPLE SUSPENSION

The TNX soaks up bumps, ruts, cracks and other surface imperfections without getting out of shape. Our test truck had a slight nose-up attitude when it flies through the air, but when I tapped the brakes slightly the nose came back down to prepare it for a landing. Skying the TNX off the huge, practically vertical freestyle jump was awesome. The hang time seemed endless, and I was able to make the truck dance in the air by working the throttle and brake while I steered from left to right. The super-cross-style jumps that riddled the course were no problem for the TNX's supple, long travel suspension; in fact, the truck was right at home with the brutal track conditions.





SPECS

Manufacturer Tamiya

Model TNX

Scale 1/8

Price \$450

DIMENSIONS

Wheelbase 14 in. (356mm)

Width 16 in. (406mm)

WEIGHT

Total, as tested 159 oz.
(4,500g)

CHASSIS

Type Plate with ladder bars

Material Aluminum

DRIVE TRAIN

Type Shaft-driven 4WD with 2-speed

Primary Clutch bell/spur gear

Drive shafts Plastic universals with aluminum slider shafts

Differentials Gear

Bearing type Rubber-sealed

SUSPENSION

Type Upper and lower A-arm with C-hubs

Shocks (8) plastic-body, fluid-filled

WHEELS

Type Split-spoke chrome

TIRES

Type Split-chevron tread with foam inserts

ENGINE AND ACCESSORIES

Engine Tamiya FS 18-RS

Carburetor Slide

Manifold Metal-cast

Pipe Plastic, dual-chamber

Fuel tank 150cc

SOURCES

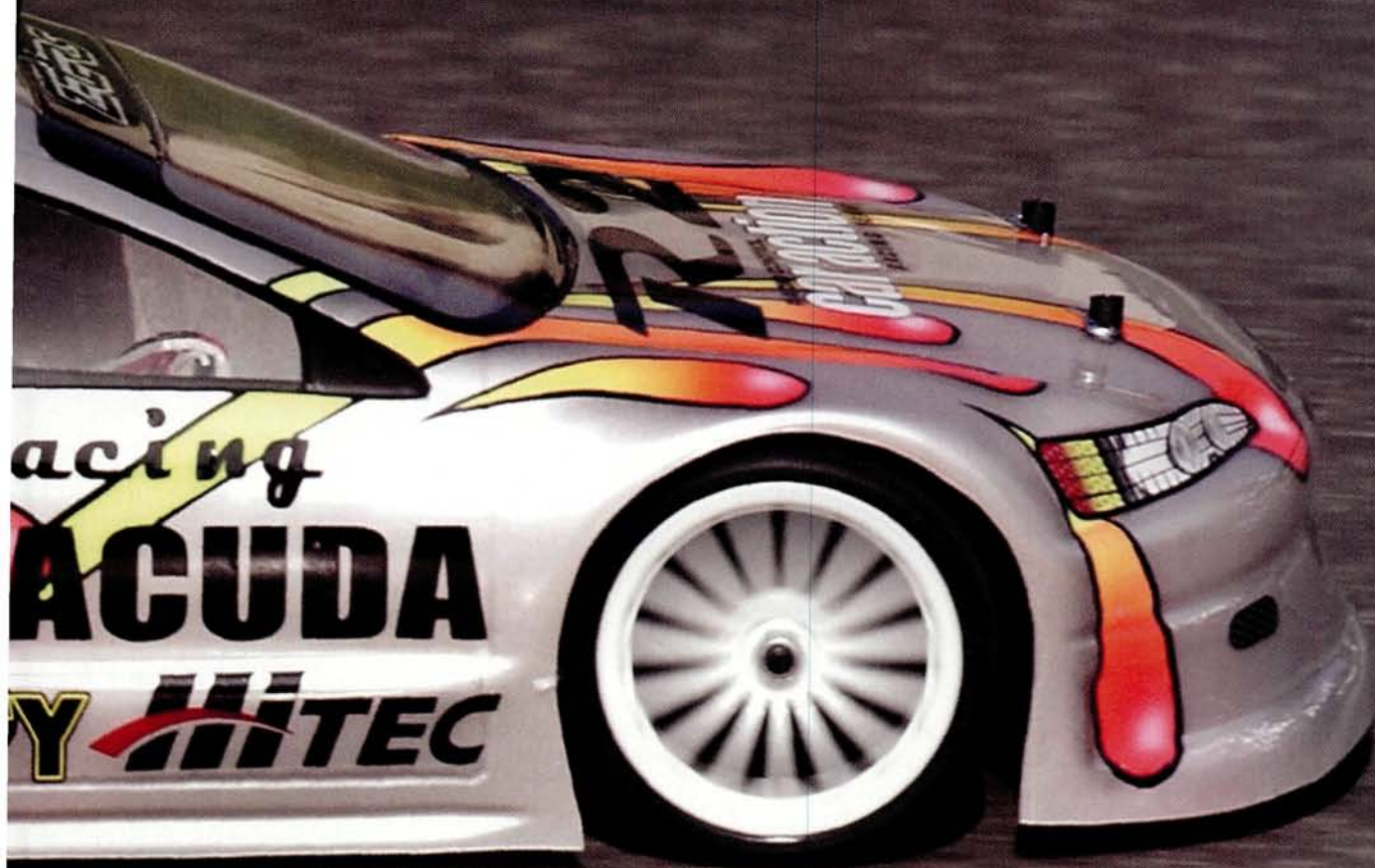
TAMIYA AMERICA INC.

(800) 826-4922; tamiausa.com.

Alex Racing Barracuda R2



ALEX RACING'S BARRACUDA R2 has just entered the sea of electric-powered touring sedans, and although the shaft-powered chassis hasn't had much time on the national racing circuit, it has earned significant racetrack cred in a short time. At press time, the Barracuda had already won the KO Grand Prix in Japan and had taken second place at the 2003 Reedy Race of Champions. It isn't hard to guess why the sedan is doing well, with features that include a light graphite drive shaft, aluminum bulkheads, aluminum threaded-body shocks, precision-cut ring and pinion gears and a one-way front differential. I got my hands on an R2 to see how well it all comes together on the track.



FLYING FISH

KIT FEATURES

CHASSIS. Although its traditional 2mm carbon-fiber lower deck look likes other carbon decks, it's one of narrowest on the market. This means that the weighty battery pack and electronics are close to the car's centerline, and that means excellent transitional handling through the turns. The six slots cut in the chassis' right side accommodate a 6-cell pack, and you can secure them with molded battery braces or strapping tape. I opted to use black, heavy-duty strapping tape. The rest of the electronics, including the motor, are on the left side of the chassis' lower deck. Laterally, the weight of these components is distributed fairly equally, and that's a big plus for consistent handling.

The 2mm carbon-fiber upper deck is mounted on the front and rear bulkheads. It's very spidery and allows some torsional flex to absorb torque-steer forces and help the Barracuda stay planted.

The chassis' finishing touch is an ample foam bumper that's supported underneath by a rigid plastic bumper. The foam is large enough to reach the nose of most touring car bodies, so you shouldn't have to add any foam to support the bodywork.

DRIVE TRAIN. The meat of the R2's drive train is a central graphite shaft that spins effortlessly on metal-shielded ball bearings and has anodized-aluminum gear adapters at both ends. The adapters hold 16-tooth pinion gears that mesh with the front and rear diff gears. Alex Racing obviously had racers in mind when it decided to include a front one-way diff as in the R2; the rear houses a standard ball diff. Both diffs have clear plastic cases that prevent dirt and debris from making its way towards the vulnerable gears. The rear diff has Delrin outdrives and the front has steel outdrives. At all four corners, CV-type drive axles deliver power efficiently. Aluminum drive hexes are standard, and they spin truer than plastic parts usually do. To complete the drive train, a 78-tooth, 48-pitch spur gear is included, but the pinion choice is left to you.

SUSPENSION AND STEERING. The eye-catching, blue-anodized, aluminum threaded shocks have aluminum O-ring collars that allow you to adjust the car's ride height easily. Low-friction Teflon shock pistons provide silky smooth suspension action. The shocks are installed between carbon-fiber shock towers with six mounting locations and molded lower A-arms with multiple mounting holes. The distinctive suspension arms do not pivot on inner hinge pins but on pivot balls. They are molded to capture the pivot balls near the chassis' centerline. They also feature molded ball studs for optional swaybars and holes drilled for the droop screws. The front C-hubs, knuckles and rear hub carriers are all made of a very resilient composite plastic. The hub carriers have exceptionally high mounting points for the car's hardened-steel turnbuckle camber links, and the inboard ends of the links are mounted high on the front and rear bulkheads. This setup gives the Barracuda a very low roll center, and that suits an electric touring car, since both of the heavy components (the battery and motor) are held very low on the chassis. A standard, twin bellcrank system handles the steering; it rides on precision, metal-shielded ball bearings, and a servo-saver is incorporated into the right bellcrank.

BODY, WHEELS AND TIRES. As is usual with most high-end touring cars, a body is not included with the R2. I chose the low-slung Trinity Reference body because its aerodynamics provides balanced traction. The choice of wheels, tires and inserts is also left to you. I decided on Take-Off CS32s tires for the front and the rear. They come in various compounds and are mounted on 18-spoke wheels with firm foam inserts. Take-Off treads are popular handouts at big events, and they're excellently mounted. Just tear into the polybag and mount them; you can leave the CA in your pit box!

BUILDING & SETUP TIPS

The Barracuda goes together much like other shaft-drive touring cars, but the Japanese instructions and English supplements are often vague, and this slows down the build. If you've already built a sedan or two, the build will go much smoother. These tips will help, too.

ALL STEPS. You must use screws of the correct length and size for every step. Once you have opened a couple of parts bags, you will notice an abundance of screws in many lengths. Use a screw of the wrong size, and it may loosen or strip out the threads of the piece into which you screw it. A digital caliper or metric ruler will help you get the sizes right.

CHASSIS PREP. If you want the car to have the lowest possible center of gravity, grind away material from around the battery slots, which are too narrow for the cells to seat securely. Using a sanding tool or a file top, bevel the slot openings. Check the cells' fit in the slots as you go to avoid grinding away too much material. When you've finished, seal and smooth the sanded edges by applying thin CA with a Q-Tip.

STEP H-1: CV ASSEMBLY. Some of the yokes didn't rotate freely inside the dogbones until I sanded them lightly with 200-grit sandpaper. To eliminate all binding, I used Associated's black thrust-bearing grease on the yokes

and carefully wiped away any excess so it wouldn't attract dirt.

STEP K-1. SHOCK ASSEMBLY. Follow the cartridge-assembly diagram precisely. For a properly functioning shock, you'll need all of the Teflon spacers and rubber O-rings. The diagram does not accurately illustrate the Teflon shaft guide that snaps into the bottom of the shock cartridge and shows it as a flat washer. Install the piece so its "nose" snaps into the cartridge's shaft opening.

you'll need

- Transmitter and receiver
- Electronic speed control
- Motor
- 6-cell battery pack
- Charger
- Steering servo
- Shock oil
- Diff grease
- Wheels and tires
- Body
- Pinion gear

factory options

- Graphite center shaft w/aluminum tips—PB049x
- Alloy shaft holder—A6720x
- C-hub rear set—A6709
- Long-span arm set—A6712
- Mid-span arm set—A6713
- One-way bearings (4)—A6525
- Titanium-nitride suspension balls (4)—A6510
- Aluminum clamping hubs (4)—A6522
- Titanium upper links (4)—A6542

THE COMPETITION

| MANUFACTURER & CAR | CHASSIS | DRIVE TRAIN | FRONT-DIFF TYPE | DRIVE AXLES | SHOCKS | BEARINGS | PRICE | REVIEWED |
|-----------------------------------|---------------------------|-------------|-----------------|-------------|-------------------|-----------------|-------|----------|
| Alex Racing Barracuda R2 | Graphite plate | Shaft | One-way | CV-type | Threaded-aluminum | Metal-shielded | \$300 | 1/04 |
| Team Associated Team TC3 | Plastic semi-tub | Shaft | Ball | MIP CVDs | Threaded-aluminum | Rubber-shielded | \$300 | 12/01 |
| Team Losi Triple-XS Graphite Plus | Graphite/plastic semi-tub | Single belt | Ball | MIP CVDs | Threaded-aluminum | Metal-shielded | \$280 | 6/03 |
| XRAY EVO2 | Graphite plate | Double-belt | Ball | CV-type | Threaded plastic | Metal-shielded | \$340 | 11/02 |
| Yokomo SD SSG Special | Graphite plate | Double-belt | Ball | CV-type | Threaded aluminum | Metal-shielded | \$330 | 9/03 |



The shaft-driven R2 has a very light graphite shaft with a blue-anodized aluminum spur-gear adapter. The motor mount is also aluminum.

SPECIFICATIONS

MANUFACTURER Alex Racing
MODEL Barracuda R2
DISTRIBUTED BY Speed Tech R/C
SCALE 1/10
PRICE \$299.99
Varies with dealer

DIMENSIONS

Wheelbase 10.2 in. (260mm)
Width 7.45 in. (190mm)

WEIGHT

Total, as tested 49.74 oz. (1,410g)

CHASSIS

Type Double-deck plate
Material Woven carbon-graphite

DRIVE TRAIN

Type Shaft-driven, full-time 4WD
Primary 30*/72, 2.4:1
Internal ratio 2.44
Final drive ratio 5.86
Drive shafts Steel universal joint
Differentials (F/R) One-way/ball type with Delrin outdrives
Bearing type Metal-shielded ball bearings

**Pinion not included.*

SUSPENSION (F/R)

Type Lower A-arms with upper links
Shocks Aluminum, oil-filled, threaded-body

WHEELS

Not included

TIRES

Not included

Below right: the Barracuda's front and rear suspension arms do not pivot on the usual inner hinge pins. Instead, they move up and down on pivot balls captured by the A-arms.

Below left: threaded links up front adjust camber and toe. The threaded-body shocks have six mounting-hole positions on the towers to fine-tune handling.



PERFORMANCE

My initial test setup came directly from the kit manual and proved to be an excellent starting point. I immediately noticed the R2 felt very well balanced. I could stand on the throttle, and the car wouldn't step out at all, even with the torque of the longitudinally placed Orion 10-double loading the chassis. It was stable in the turns and super-responsive to all throttle and steering inputs, but it felt a little edgy and loose when pushed hard. The tight SoCal track has several back-to-back turns, which require exceptional transitional handling, and a fast sweeper challenges the limits of traction; I felt the R2 could improve in both sections. After running a couple of packs, I sauced the TakeOff CS-32 tires with traction compound (which is a must at SoCal for optimum traction) and added an extra degree of negative camber to get some more rubber on the track as the chassis leaned over. Now the car snicked through the transitions effortlessly and felt tight; this is what I prefer. I could crank the steering wheel in either direction in the infield and could actually oversteer the car without breaking the rear wheels loose. Speed through the sweeper also improved, and it was easy to feel when the R2 was on the edge of traction. Corner exits were impressive; when the one-way hooks up and the slick shaft drive unloads, the R2 slingshots away like it was shot out of, well, a slingshot. The only time traction became an issue was under braking, since the one-way-equipped drive train allows only the rear wheels to brake. As long as the brakes weren't pushed to lockup, I was able to scrub speed confidently. If you're new to driving with a one-way, try dialing out brake throw until you get used to rear-wheel braking. And think ahead; picking out brake markers on the track in advance helps too. I didn't have any wild tangles with the track's perimeter walls to test extreme-abuse durability, but the usual board taps were easily shrugged off. I ran 4.5mm of ride height, so the chassis scraped the asphalt in many corners. I'll use a little CA glue to seal the worn edges, but otherwise the R2 was unscathed. After spending a few hours at the track with it, though, I'm extremely impressed by the R2's handling prowess and by how effortlessly it turned competitively fast lap times—right out of the box.

THE VERDICT

Alex Racing's Barracuda R2 is a high-tech touring car that's built to race and has a seemingly endless list of tuning options. It's all business, but a little style doesn't hurt, and the blue-anodized aluminum pieces finish it off so nicely that it's sure to attract attention wherever you show up with it. The chassis' fine construction and immediate success on the national racing scene had me expecting a first-class ride, and the Barracuda R2 delivered exactly that. It looks good, drives well and has exotic-car appeal, but the best reason to take a hard look at the R2 is that it just might help you win some races.



RATING THE ALEX RACING BARRACUDA R2

| | POOR | FAIR | GOOD | VERY GOOD | EXCELLENT |
|-------------------------------|--|------|------|-----------|-----------|
| INSTRUCTIONS | English supplements support the Japanese manual, but the text needs to be more thorough. | | | | |
| PARTS FIT AND FINISH | Some parts had to be sanded to prevent them from binding. | | | | |
| CORNERING ABILITY | The front one-way allowed great corner speed as long as I approached the turns correctly. | | | | |
| ACCELERATION | The Barracuda R2's drive train is really efficient, and that's shown by its superb acceleration. | | | | |
| DURABILITY | This car is as bulletproof as you'd expect a top-shelf tourer to be. | | | | |
| RADAR-TESTED TOP SPEED | 32.6MPH* | | | | |
| BEST BUYER | Sedan racers and RC exotica fans with previous building experience. | | | | |

* Top speed varies with equipment used.

LIKES

- > Race spec all the way.
- > Excellent handling with front one-way.
- > Exceptionally smooth drive train.

DISLIKES

- > Chassis is tight on space for the electronic gear.
- > Some parts had to be sanded to prevent them from binding.
- > Shock fluid and diff grease aren't included.
- > Instructions need work.

TEST GEAR



Novak GT-7 ESC

The GT-7 is used by many of today's top racers such as Brian Kinwald and Jukka Steenari. Seven distinct factory-programmed profiles can be chosen to suit a variety of track conditions, and one profile can be completely customized to your liking.

Additional items used to complete the Barracuda R2

Futaba 3PK transmitter

Novak Xtra receiver

Team Trinity GP 3300 matched cells

Team Trinity 10x2 D5 Flatliner modified motor

Team Trinity Reference S-sedan "Y" 190mm body

Take-Off CS-32 tires

Hitec 5925MG steering servo

SOURCES

ALEX RACING distributed by Speed Tech R/C (909) 869-9443; speedtechrc.com.

FUTABA distributed exclusively by Hobbico/Great Planes Model Distributors Co., (800) 637-7660; futaba-rc.com.

HITEC RCD INC. (858) 748-6948; hitecrd.com.

NOVAK ELECTRONICS INC. (949) 833-8873; teamnovak.com.

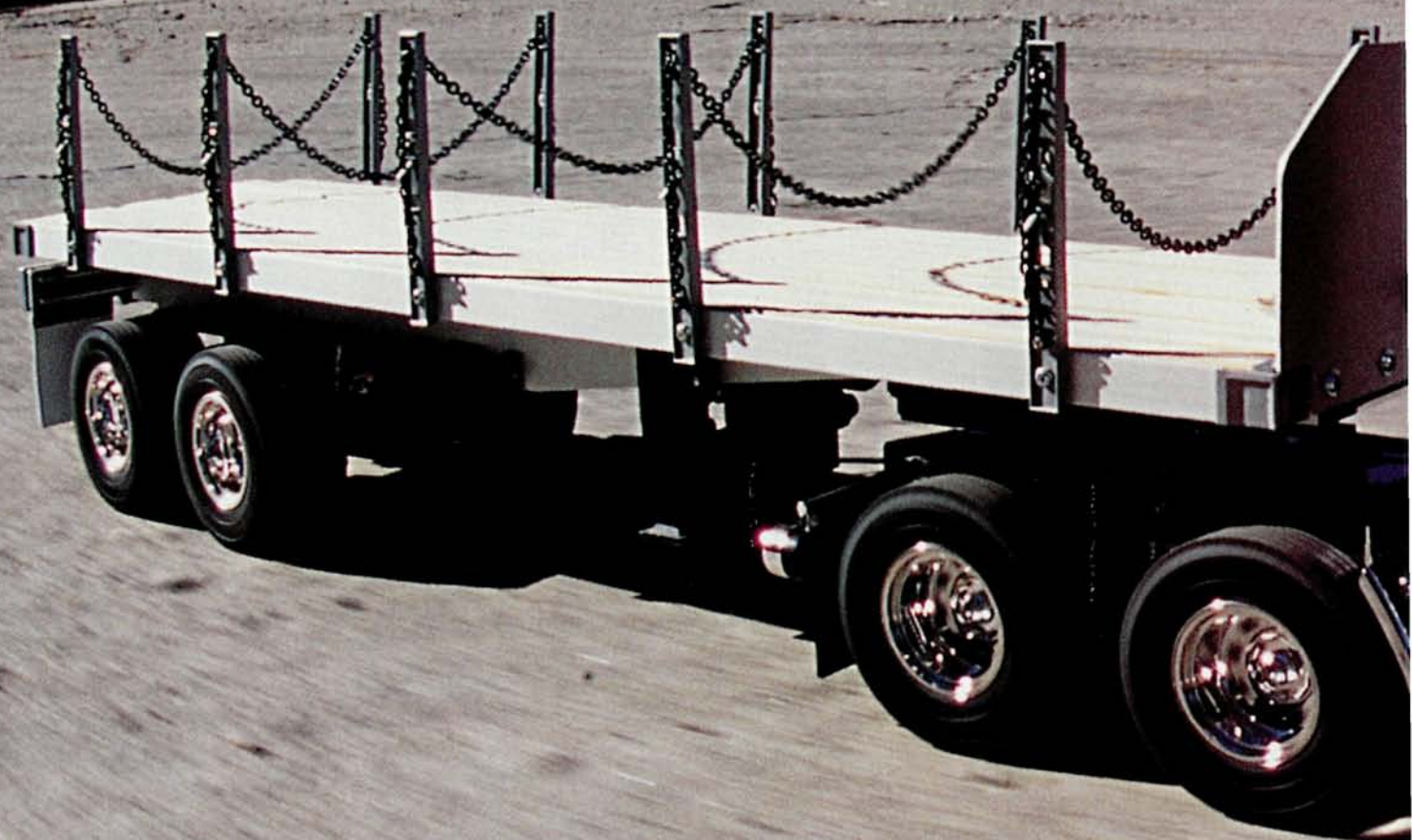
TAKE OFF distributed by Schumacher USA (813) 889-9691; racing-cars.com.

TEAM LOSI distributed by Horizon Hobby Inc. (800) 338-4639; teamlosi.com; horizonhobby.com.

TRINITY PRODUCTS INC. (732) 635-1600; teamtrinity.com.

Tamiya Knight Hauler

RC CARS AREN'T ALWAYS ABOUT RACING AND BASHING around the yard; for some drivers, it's all about detail. Tamiya has satisfied detail buffs for years with its extensive lineup of tractor-trailer trucks and optional hop-up parts. These trucks have a lot to offer, including highly detailed plastic bodies, leaf-spring suspensions, working fifth wheels, 3-speed transmissions and more. The latest addition to Tamiya's tractor-trailer garage is the Knight Hauler, and it's sure to please. Let's see what this big rig has to offer.



ROYAL RIDER

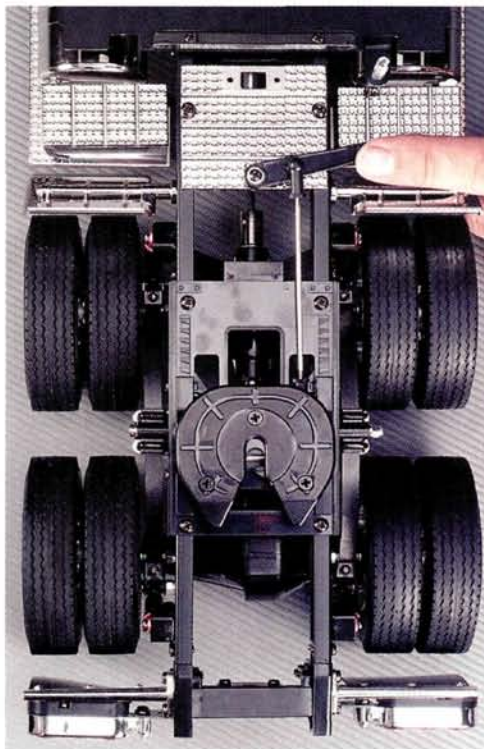


KIT FEATURES

CHASSIS. The chassis's main structure consists of two, black-anodized aluminum C-channel frame rails that span the length of the truck. Seven plastic cross-members and the tranny housing tie the rails together to form a rigid package. The steering and shifter servos are mounted between the rails in the front of the chassis. Resting above the rails is a plastic molded shelf that provides a home to most of the truck's electronics (an ESC and a receiver). Speaking of electronics, the battery pack is mounted sideways on the chassis below the frame rails, and the chrome fuel tanks cover it. Toward the chassis' rear you'll find the fifth wheel (which is mounted in the same place as it is on real rigs). Just like its full-size counterparts', the Knight Hauler's functional fifth wheel is used to couple the optional trailers that Tamiya offers (you can choose from a standard semitrailer, a pole trailer, a fuel trailer, or a flatbed semitrailer). There are also plenty of chrome side steps and other accessories to help dress up the chassis.

DRIVE TRAIN. One of the truck's special features is its 3-speed transmission powered by a closed-endbell 540 motor; it can be shifted from a rather hefty 3-channel radio or manually set with some spacer clips on the shifter rod. Inside the tranny, you'll find multiple gear sets, shift forks and springs between the shift plates; a two-piece plastic housing protects the tranny's gears and inner workings. A long metal drive shaft connects the tranny's output shaft to the front rear axle's input shaft, and a short dogbone connects the second rear axle. It's interesting that the front drive axle has two pinion gears: one is the input pinion and the other is the output pinion that drives the second axle. Both axles use steel drive shafts to spin the wheels, and brass bushings support all the rotating parts.

SUSPENSION AND STEERING. A cast-metal crossbeam-style axle handles the steering, and the Knight Hauler's suspension uses metal leaf-springs to support the cast-aluminum front beam axle and the rear drive axles—much like a full-size truck. U-bolts attach the front axle to its leaf-springs, and plastic trailing arms keep the drive axles centered under the



The fifth wheel isn't there just for looks; it automatically hooks onto one of Tamiya's four optional trailers when you back the truck into the pin; it does, however, need to be detached by hand.

frame rail. Machined-aluminum, red-anodized "shocks" with internal springs are attached to each axle but are mainly there for looks. Tamiya also offers optional, blue-anodized oil-filled shocks for the truck. A 2-link steering system gets the truck around obstacles. A single fixed link runs from the included servo-saver to the left axle. Another longer fixed link connects the two axles to complete the system.

BODY, WHEELS AND TIRES. The Knight Hauler's body is a work of art; this comes as no surprise, since Tamiya is king when it comes to molding plastic. In addition to its RC endeavors, Tamiya is well-known worldwide for its stellar plastic models, and the company's attention to detail shines through on this truck. The body is molded in white styrene plastic and is loaded with details, including smokestacks with metal heat shields, side mirrors, a chrome grill and tinted windows. Tamiya even includes a detailed interior that features a dashboard and two seats to add to the truck's realism.

Realistic rubber tires are mounted to 10 beautifully chromed plastic wheels. The rims and tires fit together tightly and don't require glue. The front rims ride on bronze bushings, and the two rear wheels are driven by a standard wheel hex.

BUILDING & SETUP TIPS

Before you start assembling the chassis, I suggest that you start your bodywork and painting first. The Hauler's "hand" body requires special prepping and painting techniques, but the results are worth the effort. When you've finished the chassis, you can bolt the body on right away.

REMOVE THE MOLD LINES.

Tamiya does a very good job of placing the body mold lines where they can't easily be seen. You might not be able to see them, but I know they're there, and that just drives me crazy. I use an X-Acto knife to scrape away mold lines; then I use a little automotive body filler to smooth the areas.

TIME FOR PRIMER.

I use automotive primer to prime my bodies; it flows better and dries faster than the primers designed for models. The primer does two things: it gives the paint something to stick to and it lets you see whether there are any imperfections in the body. If there are, you can sand the areas or add more filler.

LAYING DOWN THE PAINT.

You can airbrush the body, but I think that a spray can will give you better results because of the truck's size. Place the paint can in warm water before spraying. Warming the can increases the pressure and makes the paint flow better.

When you've finished painting your rig, if you aren't happy with the finish or you see dust stuck to the paint, you can polish the finish when it's dry. Wait for at least 10 days before you do this; the paint takes time to harden completely. It may be dry to the touch a couple of hours after you have applied it, but underneath, it's still soft. So wait; the harder the paint is, the better your polishing job will be.

you'll need

- 2- or 3-channel radio and receiver
- Steering servo
- Reversing ESC
- 6-cell stick pack
- Enamel paint
- Charger

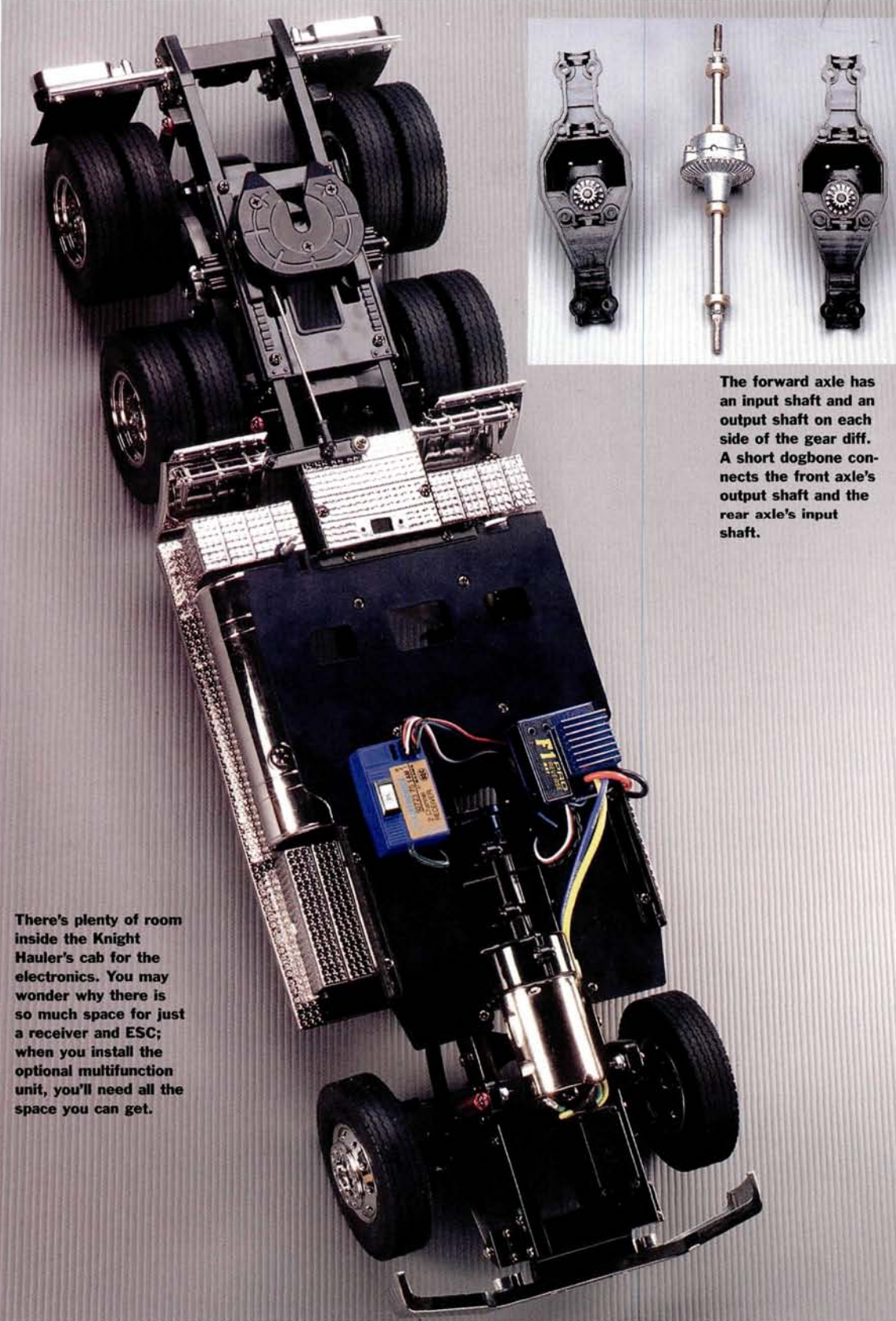
factory options

- Tractor-truck electrical unit set—item no. 56501
- Semitrailer light set—56502
- Tractor-truck oil shocks—56503
- Motorized support legs—56505
- Telescopic antenna—56507
- Aluminum truck wheels (F/R)—56508/56509
- Truck sound-effects set—56510
- Truck multifunction control unit—56511
- Several trailer choices are available

Multifunction control unit

Out of the box, the Knight Hauler looks great. As you can see in our photos, it's hard to tell whether the thing is real or RC. Well, believe it or not, you can make your Knight Hauler even more like the real thing by installing Tamiya's new multifunction control unit. This was designed to fit inside the truck body's cab in one neat package. It includes 20 bright LEDs that handle nine lighting functions. Among the lights are headlights, fog lamps, hazard lamps and backup lamps. And 24 sound effects come out of the large speaker box; you can hear the truck idle, rev up, shift and more. The volume on the speaker can also be adjusted to be as quiet or as loud as you want it. The system is controlled by a 4-channel radio by moving certain trims up, down, left and right. I just got my hands on one of these awesome units and will install it in my rig in addition to the other cool parts. Look for my review in a future installment of my "4x4" column.





The forward axle has an input shaft and an output shaft on each side of the gear diff. A short dogbone connects the front axle's output shaft and the rear axle's input shaft.

SPECIFICATIONS

DISTRIBUTOR Tamiya USA

MANUFACTURER Tamiya

MODEL Knight Hauler

SCALE 1/14

PRICE \$380

Varies with dealer

DIMENSIONS

Wheelbase 18.3 in. (467mm)

Width 7.2 in. (185mm)

WEIGHT

Total, as tested 109 oz. (3,100g)

CHASSIS

Type C-channel rails

Material Aluminum

DRIVE TRAIN

Type Enclosed 3-speed gearbox

Final drive ratio (1st) 32.49:1;

(2nd) 17.76:1; (3rd) 10.66:1

Drive shafts Dogbone

Differentials Grease-filled bevel gear diff

Bearing type Oilite/plastic bushings

SUSPENSION (F/R)

Type Leaf-spring

Shocks Spring-loaded aluminum

WHEELS

Type Chromed plastic

TIRES

Type Realistic truck tread

Below: here are the transmission's inner workings. You can shift gears by moving the shift forks to make contact with the different sets of gears. You can shift the tranny by moving spacer to different locations on the shift rod, or you can hook the tranny up to a servo and operate it from the radio.



There's plenty of room inside the Knight Hauler's cab for the electronics. You may wonder why there is so much space for just a receiver and ESC; when you install the optional multifunction unit, you'll need all the space you can get.



Left: the Knight Hauler uses leaf-spring suspension just like real rigs do. The spring-loaded, red-anodized shocks are mainly there for looks; Tamiya offers oil-filled dampers to soften the ride.

PERFORMANCE

I prepared to drive conservatively when I went out to drive my rig for the first time. I had spent a lot of time detailing the body, and I didn't want to hit anything and scratch it! Since I used a 2-channel radio on my truck, I set the tranny in first gear by placing the two provided spacer clips in the appropriate spot on the tranny's shifter rod. I eased into the throttle, and it wasn't long before I reached top speed. The gearing is so low in first gear that the truck quickly slowed down as soon as I let off the throttle, and I was able to spin the tires by quickly jabbing the throttle on the radio.

I decided to try second gear, and I was happier with the truck's acceleration and top speed. If you plan to lock the tranny in one gear, first gear is best reserved for when you tow with a loaded optional trailer.

After driving around in second gear for a while, I switched to third. Acceleration slacked a little, but top speed was noticeably higher. A warning though: be careful when getting on the brakes in third gear. Without a trailer attached, the rear end is very light and doesn't get much traction; the tires can lock up, and you'll need a little extra distance to bring the big rig to a stop.

The steering worked well at all speeds, but I don't recommend that you try to make a sharp turn at top speed in third gear; there's a chance that you'll flip the truck and ruin your detail job. Of course, I couldn't build a truck such as this one and not have a trailer to hook it to. I used one of Tamiya's flatbed trailers to get a feel for the real deal. The trailer features an aluminum frame, leaf-spring suspension and wooden strips for the bed. The leg supports are set up to retract when the truck is backed into the hitch pin—what a cool feature! When you disconnect the trailer from the truck, you have to manually pull down the legs until they lock. In similar fashion, the Knight Hauler's fifth wheel is designed to hook the hitch pin automatically, but it must be disconnected manually. I set the trailer up with a few cans of soda to weigh it down a little and backed the truck into the trailer. The two locked trailer legs retracted, and I took off to deliver my load (right back to me because I was thirsty!). The rear wheels were better planted with the extra weight of the trailer on them, and the truck came to a more sure-footed stop when I applied the brakes from full speed.

THE VERDICT

"Breaker 1-9, breaker 1-9: this truck is the ultimate ride for big-rig fans!" Tamiya's superior manufacturing and detailed instructions make the truck a pleasure to build. It's perfect for beginners as well as advanced modelers. The truck is fun to drive, and it looks great on display, too. And don't forget about all the trick optional parts; Tamiya offers just about everything you'll need to enhance your trucking experience (minus your Class A license). There's no doubt that you're sure to turn heads with this rig (insert sound of good-buddy air-horn sound here). Ya'll better put the hammer down and head down to your local hobby shop to pick one up. Just watch out for Smokey on your way.



LIKES

- > Scale looks.
- > Lots of great option parts.
- > Long run times.

DISLIKES

- > Body can be easily damaged, if you're not careful.

TEST GEAR



LRP F1 Pro Reverse ESC

The Knight Hauler doesn't come with a speed control, so you can choose which kind you want to use. I use an LRP F1 Pro Reverse in my rig. It features easy setup, fully proportional forward and reverse, glitch prevention and reverse lockout. It comes with all the correct connectors installed, so you can simply drop it right into the truck out of the box. ESCs have to work extra hard when used at low speeds, so the large heat sink on the LRP unit is welcome.

Additional items used to complete the Tamiya Knight Hauler

Airtronics Blazer Sport radio

Airtronics 94102Z servo

Venom 3000mAh 6-cell stick pack



RATING THE TAMIYA KNIGHT HAULER

| | POOR | FAIR | GOOD | VERY GOOD | EXCELLENT |
|-----------------------|--|------|------|-----------|-----------|
| INSTRUCTIONS | Tamiya has always had the best instructions in the industry, and it shows in this truck package. | | | | |
| PARTS, FIT AND FINISH | Everything fit perfectly. There was a little flashing on a few of the body parts, but nothing to write home about. | | | | |
| CORNERING ABILITY | This rig won't be judged for its handling prowess; it wasn't designed to tear up a track, but it's good enough for the parking lot. | | | | |
| ACCELERATION | It's easy to spin the tires in first and second gear thanks to the light rear end, but overall, it accelerates as a good truck should. | | | | |
| DURABILITY | The body is molded out of ABS plastic; if you hit something, you'll break it. | | | | |

RADAR-TESTED TOP SPEED 11.8MPH* **BEST BUYER** Fans of absolute detail, trucker enthusiasts, lot lizards and fans of "Smokey and the Bandit".

* Top speed varies with equipment used.

SOURCES

AIRTRONICS
(714) 978-1895; airtronics.net.

LRP ELECTRONICS;
distributed by Team Associated
(714) 850-9342;
teamassociated.com.

TAMIYA AMERICA INC.
(800) 826-4922;
tamiyausa.com.

TEAM ASSOCIATED
(714) 850-9342;
teamassociated.com.

VENOM RACING
(800) 705-0620;
venom-racing.com.

SVM Crono RS01 RTR

THE SVM CRONO RS01 RTR BOASTS ALL OF THE GO-FAST NECESSITIES any diehard racer could want. It comes with polished, front and rear, CV-type drive axles, a Novarossi-designed 3-port .21-size engine, hardened-steel spur gear, NIMH receiver pack, anodized-aluminum shock towers and suspension components and an Airtronics FM MX-3 radio. The kit also comes with a shiny stainless-steel starter box, and as a bonus, the body comes professionally painted by Crono's in-house airbrush artist. The long list of luxury items look nice on paper, but the true test comes when the RS01's mini-pin tires hit the track—so let's hit it.





RTR *Italian-style*

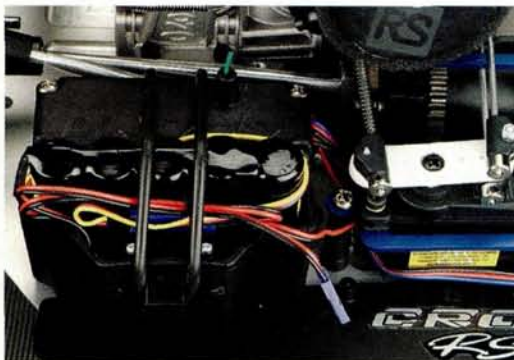
KIT FEATURES

CHASSIS. The RS01's platform is a 3mm T6 6061 aluminum chassis. Its sides are radiused slightly for extra strength and to help create an ultra-smooth finish. The front of the chassis has 8 degrees of kick-up that helps the suspension to work more efficiently when the car goes over bumps and helps to absorb landings off big jumps better. Flat, molded-plastic mudguards protect the outside of the chassis, but they don't really prevent dirt from making its way inside. A large torque rod is bolted between the center of the chassis and the rear bulkhead to eliminate virtually all chassis flex. A threaded-steel turnbuckle does essentially the same thing up front by bracing the center diff mount with the upper steering brace. All of the RS01's electronics sit on the chassis' right side, and the steering and throttle servos are on a blue-anodized aluminum servo tray. The top of the chassis has been milled out to reduce weight and to increase the surface area for engine cooling.

DRIVE TRAIN. The RS01 RTR's 3 gear differentials are filled with heavy grease and sealed with fiber gaskets. Inside, you'll find 4 hardened spider gears and 2 output gears. The diffs are sealed nicely, so you can use fluids of various weights to alter diff action. The center diff has a 50-tooth steel spur gear that spins a 14-tooth clutch bell. The front and rear diffs are equipped with 43T ring gears that are paired with 13T pinion gears. A pair of polished stainless-steel dogbones links the 3 diffs for full-time 4WD. The front and rear drive axles are also made of polished stainless steel, but they are CV-type and more efficient than standard dogbones. An aluminum 2-shoe clutch inside the clutch bell sets the buggy in motion as the engine's rpm increases, and an ultrareliable dual-disc brake system slows the RS01 down. The cam-actuated brake system contains two sets of calipers and brake pads that allow you to change the front and rear brake biases. Finally, the entire drive train rotates effortlessly on rubber-shielded ball bearings.

ENGINE AND ACCESSORIES. Race fans take notice because the mill mounted on the RS01 chassis is a 3-port Novarossi-bred screamer. This engine is all race—no pull-starter here! You start the engine using the provided starter box. It's a rear-exhaust engine that features ABC construction (aluminum piston, brass-plated chrome sleeve) and a 2-needle slide carburetor. An oversize snorkel air filter comes oiled and with a prefilter for extra protection against engine-damaging dirt and debris. A finned aluminum head keeps the engine temp down during normal operation. To help produce excellent midrange power, a 90-degree, polished-aluminum header is attached to a dual-chamber tuned pipe with a bright orange silicone coupler. Just in front of the engine there's a standard, 125cc, flip-top fuel tank that helps to balance the weight of the car. The tank has an internal filter and baffles to prevent fuel from splashing around and foaming (producing unwanted air bubbles). The fuel line comes installed, and the throttle linkage is spot on.

SUSPENSION AND STEERING. Protected by silicone booties, the 4 oil-filled shocks are also anodized a brilliant blue that matches the car's other



The battery box may not look pretty, but access to the receiver pack is effortless. And no, the pack isn't unplugged; the dangling wire is the charge lead.

components. Plastic preload collars set ride height. The front shock tower is made out of 2mm-thick blue-anodized aluminum and features 4 shock-mounting holes. The front suspension uses dual A-arms that are secured to cast-aluminum knuckles with captured ball ends. Each of the front suspension arms has 3 holes for anchoring them to the bottoms of the shocks. The arms pivot on extra-thick (4mm) flanged hinge pins that are secured by locking collars on the inside of the chassis, and front toe and camber can be adjusted with the suspension's threaded steel turnbuckles. Caster is easily adjusted by moving the plastic clip on the upper inner hinge pin, and a fixed,

INCLUDED ELECTRONICS & ACCESSORIES

AIRTRONICS MX-3 TRANSMITTER AND RECEIVER

That's right; you get an FM MX-3 radio with the RS01 RTR. The MX-3 is one heck of a unit with several high-end features, including 5-model memory, adjustable, dual-rate steering, EPA (endpoint adjustment), arc throttle and steering,



servo-reversing, subtrim and steering and throttle trim.

All of the features are simple to navigate with the large, easy-to-read LCD screen and two menu buttons. SVM Crono also gives you eight 8 rechargeable 700mAh AA battery cells for the radio, a rechargeable 5-cell 1100mAh NIMH receiver pack, and an 18-hour wall-mounted charger.

AIRTRONICS 94735 SERVOS

Both the steering and throttle servos offer 75 oz.-in. of torque at 6 volts. Their transit speed is 60

degrees in 0.20 second at 6 volts. The servos have nylon gears, and the throttle and steering linkages are set perfectly at the factory.

UNISTART 2000 PRO STARTER BOX

A 770 motor powers the starter box, and it's the only thing in this RTR package that has to be assembled. You will also need to buy two 7.2V stick packs or a 12V gel-cell to power the box.

EVEN MORE ACCESSORIES

Most nitro RTRs come with fuel bottles and dry-cell glow igniters. SVM Crono went a step further. Sure, it included a fuel bottle, but it's a heavy-duty 500cc fuel bottle. And the company also included a rechargeable Ni-Cd glow igniter and a wall charger for the igniter. Nice touches!

you'll need

- Fuel
- Gel-cell or two 7.2V stick packs to power the starter box

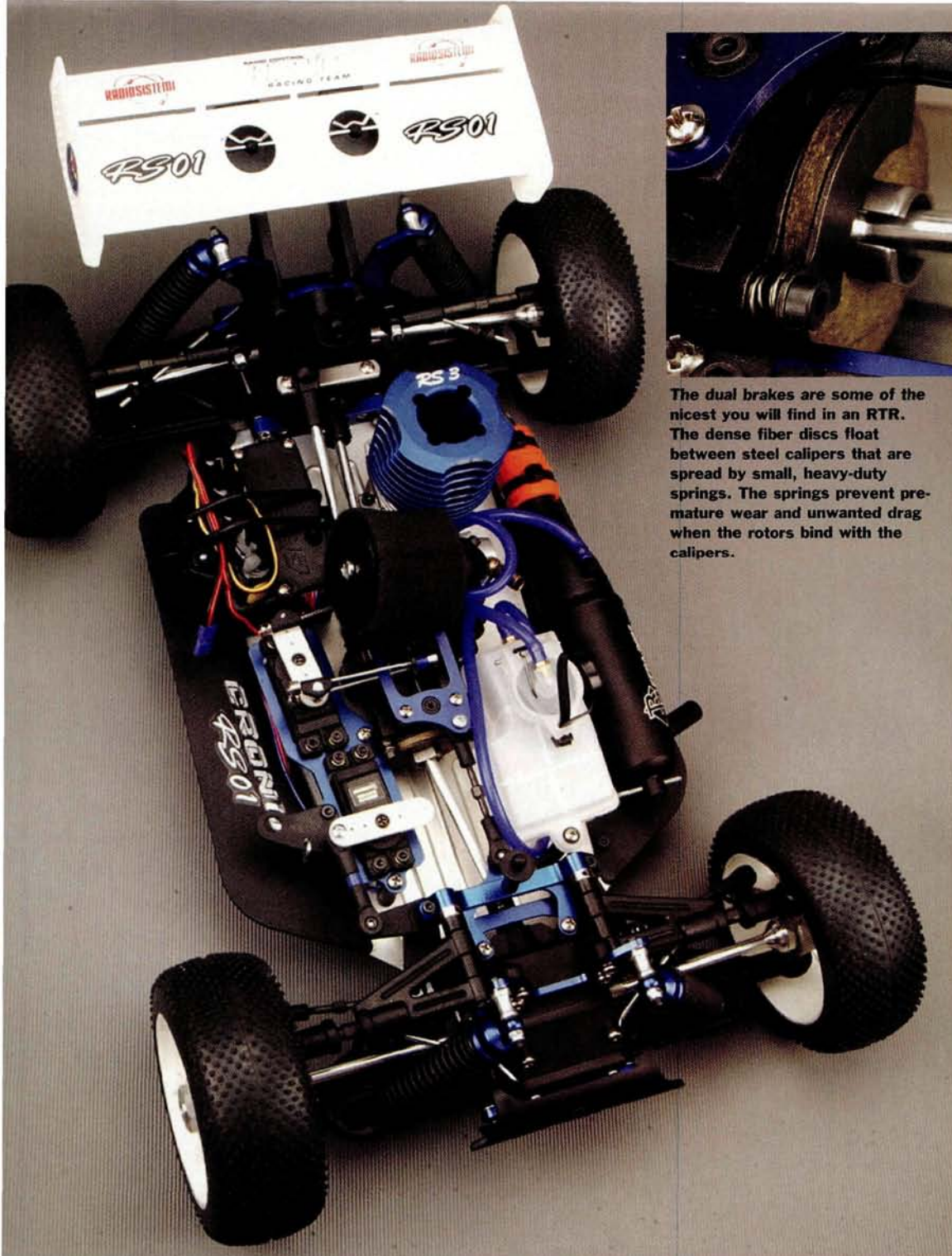
factory options*

- Clutch bells: 13T/15T/16T—item nos. S1050/S1052/S1053
- 48-tooth steel spur gear—S2470
- Ring-and-pinion gear set (45/15)—S2109
- Torsen differentials (front/center)—S2453/S2450

THE COMPETITION

| MANUFACTURER & CAR | BALL BEARINGS | FRONT AXLES | SPUR GEAR | ENGINE SIZE | SHOCKS | RADIO SYSTEM | INCL. GLOW IGNITER | PRICE | REVIEWED |
|------------------------------|------------------------|-----------------|--------------|-------------|-------------------|-------------------------|--------------------|---------------|-------------|
| DuraTrax Axis RTR | Metal-shielded | Universal-joint | Plastic | .21 | Aluminum | Hitec Lynx | Yes | \$499 | 3/00 |
| GS Racing Storm RTR | Metal-shielded | Universal-joint | Steel | .21 | Aluminum | JR Racing XR3 | No | \$560 | 11/01 |
| Kyosho Inferno MP 7.5 Sports | Metal-shielded | Dogbone | Plastic | .21 | Aluminum | Kyosho Perflex | No | \$479 | 8/03 |
| OFNA Ultra LX Pro | Rubber-shielded | Universal-joint | Steel | .25 | Threaded-aluminum | Airtronics Blazer Sport | Yes | \$320 | 3/03 |
| SVM Crono RS01 RTR | Rubber-shielded | CV-type | Steel | .21 | Aluminum | Airtronics MX-3 | Yes | \$1100 | 1/04 |
| XTM X-Terminator | Metal-shielded | Universal-joint | Steel | .247 | Aluminum | Hitec Lynx Sport | No | \$499 | 1/03 |

Prices vary with dealer



The dual brakes are some of the nicest you will find in an RTR. The dense fiber discs float between steel calipers that are spread by small, heavy-duty springs. The springs prevent premature wear and unwanted drag when the rotors bind with the calipers.



SPECIFICATIONS

MANUFACTURER SVM Crono

MODEL RS01 RTR

DISTRIBUTED BY SVM Crono

SCALE 1/8

PRICE \$1,100

Varies with dealer

DIMENSIONS

Wheelbase 12.59 in. (320mm)

Width 11.81 in. (300mm)

WEIGHT

Total, as tested 118.9 oz. (3,370g)

CHASSIS

Type Machined plate

Material 3mm 6061 aircraft-grade aluminum

DRIVE TRAIN

Type Shaft-driven, full-time 4WD

Primary 14T clutch bell/50T

spur gear

Transmission ratio 3.31:1

Final drive ratio 11.82:1

Drive shafts Polished stainless steel, including polished center dogbones

Differentials 6-gear, gasket-sealed, grease-filled

Bearing type Rubber-shielded ball bearings

SUSPENSION

Type (F/R) Double A-arms with steel turnbuckles/lower H-arm with turnbuckle upper link

Shocks Aluminum body with silicone shaft boots

WHEELS

Type White, one-piece, 6-spoke

TIRES

Type Preglued, soft-compound mini-pins with soft foam inserts

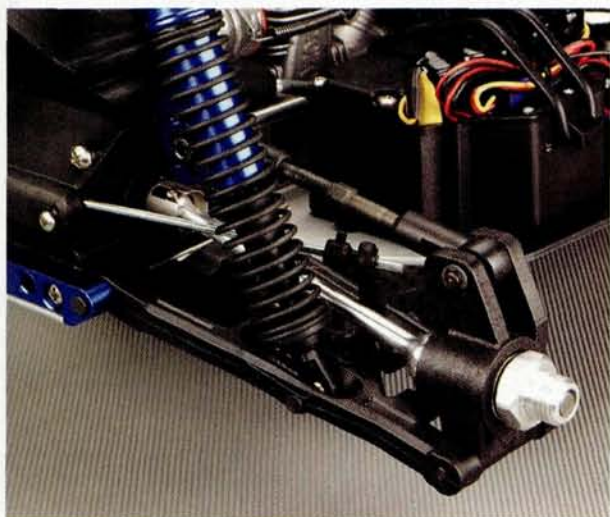
ENGINE AND ACCESSORIES

Engine .21 rear-exhaust, 3-port Crono RS-3; bump-start

Carburetor Dual-needle slide

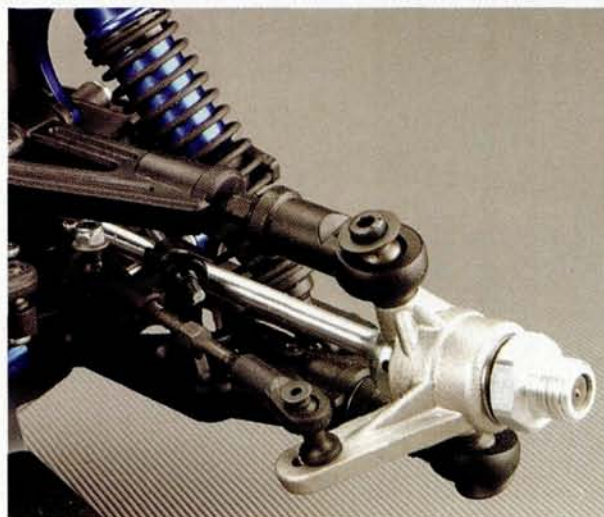
Exhaust Dual-chamber pipe with polished-aluminum 180-deg. header

Fuel tank 125cc flip top with internal filter and prefilter



Left: the RS01 comes set up with a rear suspension-arm mount with 2-degree toe-in. The rear tower has 6 shock-mounting locations, and the rear H-arms have 4, so 24 tuning setups are possible.

Right: the front arms are attached to captured rod ends with threaded links. The knuckles are made of cast aluminum and offer two anchoring locations for the steering link so that you can adjust the car's steering characteristics.



TRACK TEST SVM CRONO

aluminum drag link connects both sides of a twin-bellcrank steering system. The right crank houses a spring-loaded servo-saver. The rear suspension has H-arms and upper links that allow you to adjust camber, and rear toe-in is fixed at 2 degrees (you could alter it with the optional suspension-arm mounts). The rear shock tower offers 6 shock-mounting holes, and there are four anchoring positions in the rear H-arms. Front and rear anti-roll bars reduce chassis roll during hard cornering.

PERFORMANCE

It took very little effort to start the RS-3 engine; it came to life in seconds. To keep it running during break-in, I had to lean out the bottom-end needle an $\frac{1}{8}$ of a turn and increase the idle. After running four tanks through the engine without a break, I began to lean out the top- and bottom-end needles for a competitive tune. The engine's temp was around 220 degrees Fahrenheit, and its get-up-and-go was almost ridiculous.

With the engine running consistently well, I headed down to KZ Speedway in Sun Valley, CA, to test the buggy on the facility's gigantic off-road track. Its 25-foot triple, 22-foot tabletop, whoops and ruts were perfect tests for the RS01's capabilities. I started my first lap slowly because I wanted to get a feel for the buggy, but after just a few short turns, I hammered the throttle. This is an 1/8-scale buggy, for crying out loud! It doesn't need to be babied around any track. The rip from the RS-3 engine was impressive. Its acceleration and top speed were on a par with those of other race engines I have run. Every so often, I checked the head's temperature just to see how the tune was holding up; it was still running at between 220 and 230 degrees, so I left it alone.

The RS01 is the only RTR buggy I have seen successfully clearing a 25-foot triple. Other buggies usually fall short and case the triple's third hump. The RS01's suspension caused me concern when I initially gave it the push-down test on my workbench. I thought it was too soft and springy. To my surprise, the shocks' rebound speed actually gave it excellent traction on the unprepared, dusty KZ track surface. When the wheels rolled over ruts and bumps, the car remained composed and level.

The RS01's steering was a little disappointing, though. To get it to make sweeping turns, I had to initiate the turn off-power and square them off, or the buggy would push significantly. The steering servo didn't have enough power to control the wheels adequately through most turns. Off-power turns did not present any problems because they don't put much of a load on the steering servo. Since I used the brakes when entering turns and to control the buggy's flight characteristics, I had a good feel for how they worked, and they worked beautifully. I didn't notice any fading, and I never wished I had more braking power. I left the brakes as they came from the factory because they felt so good. After running through plenty of tanks of fuel at the track, I felt as if I had found out what I needed to know: the RS01 can be bashed because it's really tough, and it's more than capable of being a racer right out of the box.

THE VERDICT

Although the RS01 RTR's price tag is considerably higher than its competitors', the value it represents outweighs the additional costs. The RS-3 engine is a fire-breather, and it's as powerful as any other race engine that I have owned. Its look, feel and handling characteristics are a match for the best available big buggies. If you can spare the cash and building isn't your thing, the Crono RS01 RTR deserves a hard look.

BODY, WHEELS AND TIRES. The RS01's body is screen-printed on a factory assembly line; it's a hand-painted, four-color work of art. It has holes for the fuel tank and the engine's cooling head. The only work you do to finish this factory-look body is to apply the decals, and that's the best part because you can personalize it to suit your own style. The tires come glued on 6-spoke, one-piece white rims, and they feature a molded, mini-pin style lug tread supported by soft foam inserts. The large wing is secured to the rear shock tower using wing posts, and it completes this buggy's very trick look.



LIKES

- > A true, race-worthy RTR.
- > The RS-3 engine is a powerhouse.
- > Includes everything you could possibly need (except fuel).
- > Four-color custom-painted body.

DISLIKES

- > Mudguards are not radiused, so dirt collects easily on the chassis.
- > Battery-box design is not on a par with the rest of this awesome car.
- > No splashguard to protect the front brakes from spilled fuel.

TEST GEAR

O'Donnell Racing 30%-nitro fuel

O'Donnell fuel helps the engine to maintain a steady idle and makes engine tuning a breeze. Its anti-foaming agents are said to help prevent air bubbles from

making their way to the carburetor; this helps give the engine a consistent tune. O'Donnell claims that the castor/synthetic oil blend is crucial for smooth engine operation and crisp throttle response.



RATING THE SVM CRONO

| | POOR | FAIR | GOOD | VERY GOOD | EXCELLENT |
|---------------------------------|--|------|------|-----------|-----------|
| INSTRUCTIONS | The all-color CAD illustrations are the nicest I've ever seen. Routine maintenance work and repairs should be easy. | | | | |
| INCLUDED ELECTRONICS | The Airtronics MX-3 radio is feature-filled, but the 94735 steering servo is under-powered. | | | | |
| PARTS FIT AND FINISH | The drive train is as free as can be, and none of the suspension components show slop or binding. | | | | |
| ACCELERATION | This buggy truly rips with its RS3 engine. Gearing is excellently balanced between bottom-end baaaraap and top-end boogie. | | | | |
| CORNERING ABILITY | With 75 oz.-in. of torque, the steering servo struggles a bit to maintain a lock on the wheels under hard cornering. | | | | |
| BUMP & JUMP HANDLING | The buggy was composed over ruts and bumps, but it made some expectedly hard landings off jumps. | | | | |
| DURABILITY | Nothing broke, and there aren't any signs of premature wear. This buggy is as tough as they come. | | | | |
| RADAR-TESTED TOP SPEED | 45MPH* | | | | |
| BEST BUYER | off-road enthusiast who wants a top-shelf buggy that is ready to run. | | | | |

* Top speed varies with operating conditions.

SOURCES

AIRTRONICS
(714) 978-1895; airtronics.net.
SVM CRONO (800) 555-4604;
svmcrono.com.
DURATRAX/O'DONNELL RACING FUEL distributed by
Great Planes Model Distributors
(800) 682-8948; (217) 398-6300; greatplanes.com.

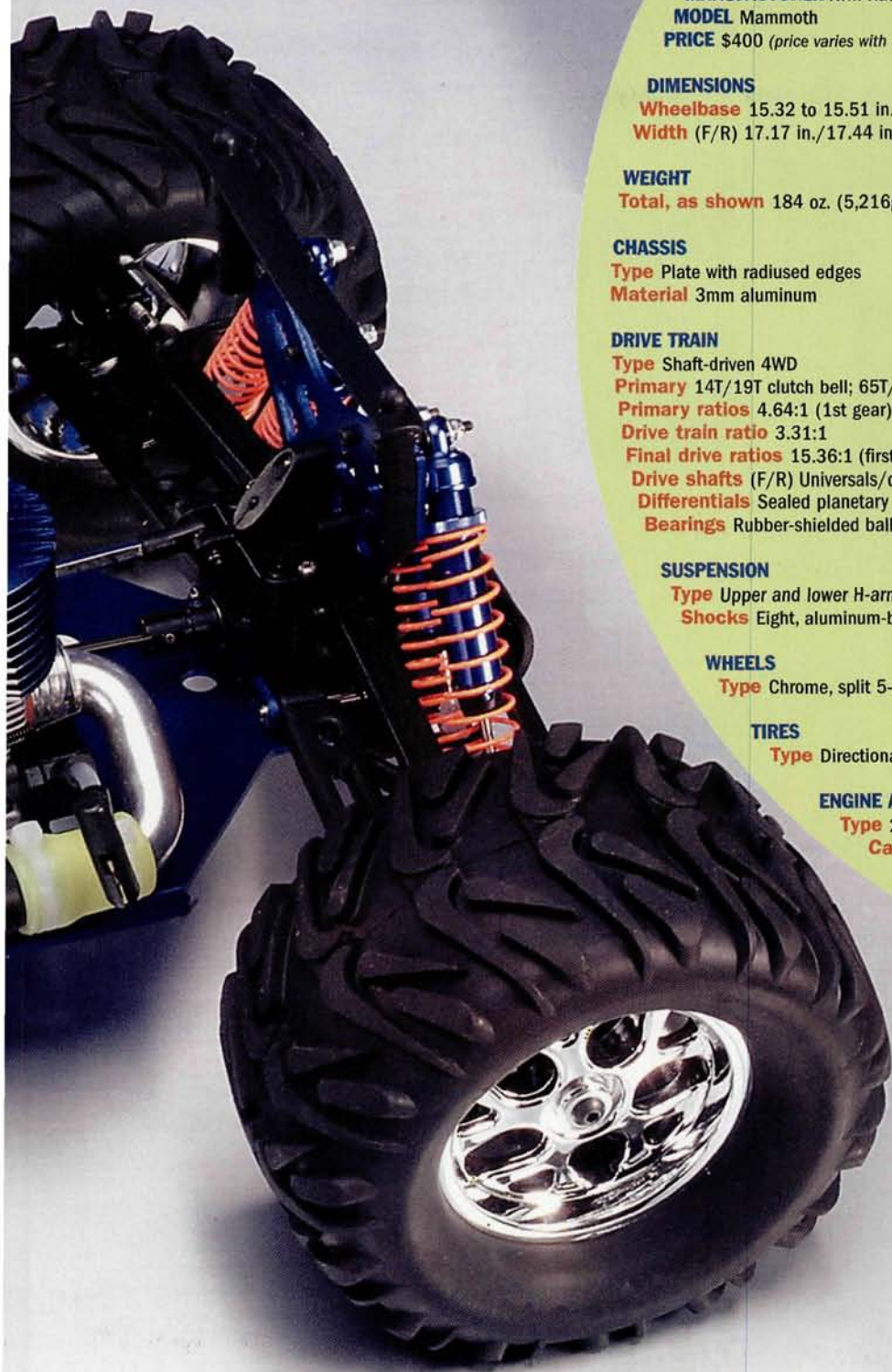
firstlook >>>

XTM MAMMOTH

by Matt Higgins



PHOTOS BY DERON NEBLETT



SPECIFICATIONS

MANUFACTURER XTM Racing
MODEL Mammoth
PRICE \$400 (price varies with dealer)

DIMENSIONS

Wheelbase 15.32 to 15.51 in. (389 to 394mm)
Width (F/R) 17.17 in./17.44 in. (436mm/443mm)

WEIGHT

Total, as shown 184 oz. (5,216g)

CHASSIS

Type Plate with radiused edges
Material 3mm aluminum

DRIVE TRAIN

Type Shaft-driven 4WD
Primary 14T/19T clutch bell; 65T/60T spur gears
Primary ratios 4.64:1 (1st gear); 3.16:1 (2nd gear)
Drive train ratio 3.31:1
Final drive ratios 15.36:1 (first gear); 10.46:1 (second gear)
Drive shafts (F/R) Universals/dogbones
Differentials Sealed planetary gear
Bearings Rubber-shielded ball bearings

SUSPENSION

Type Upper and lower H-arm
Shocks Eight, aluminum-body, fluid-filled, coil-over

WHEELS

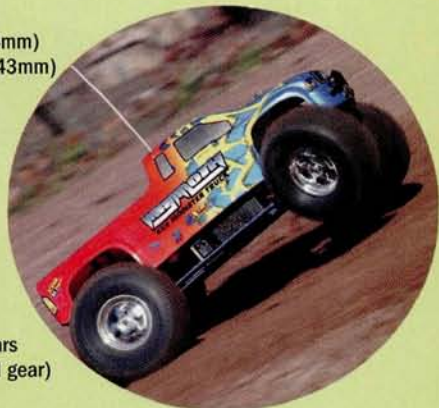
Type Chrome, split 5-spoke plastic

TIRES

Type Directional off-road treads

ENGINE AND ACCESSORIES

Type 24-7 with pull-starter
Carburetor Dual-needle slide
Manifold/Tuned pipe Tubular manifold and aluminum tuned pipe
Fuel tank 125cc



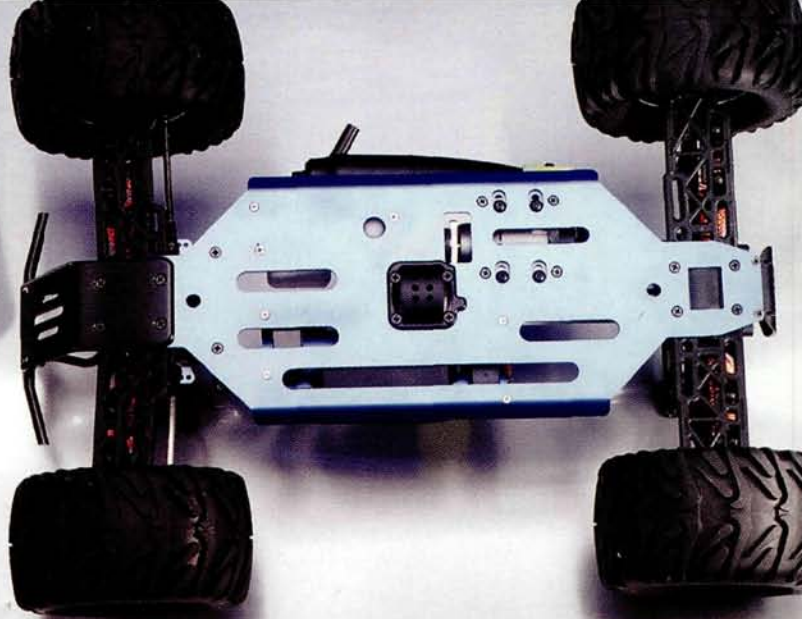
Massive monster

XTM Racing didn't want there to be any mystery about the theme of its new mega-monster when they dubbed it the Mammoth; at about 2 inches wider and 4 inches longer than a T-Maxx, it is indeed "mammoth." Although its basic shaft-drive/plate-chassis layout is much like that of an 1/8-scale buggy, this is no conversion kit. The 3mm chassis is massive, the suspension arms are extra long, and eight

shocks do the damping. And, as you might expect given XTM's high-powered X-Terminator and X-Factor, the Mammoth is also big on displacement and packs a .247 pull-start engine to get all that massiveness moving (top speed: 50mph, says XTM). We'll have a Mammoth "Track Test" in the next issue, but for now, this "First Look" will fuel the monster-truck bulletin-board posts!



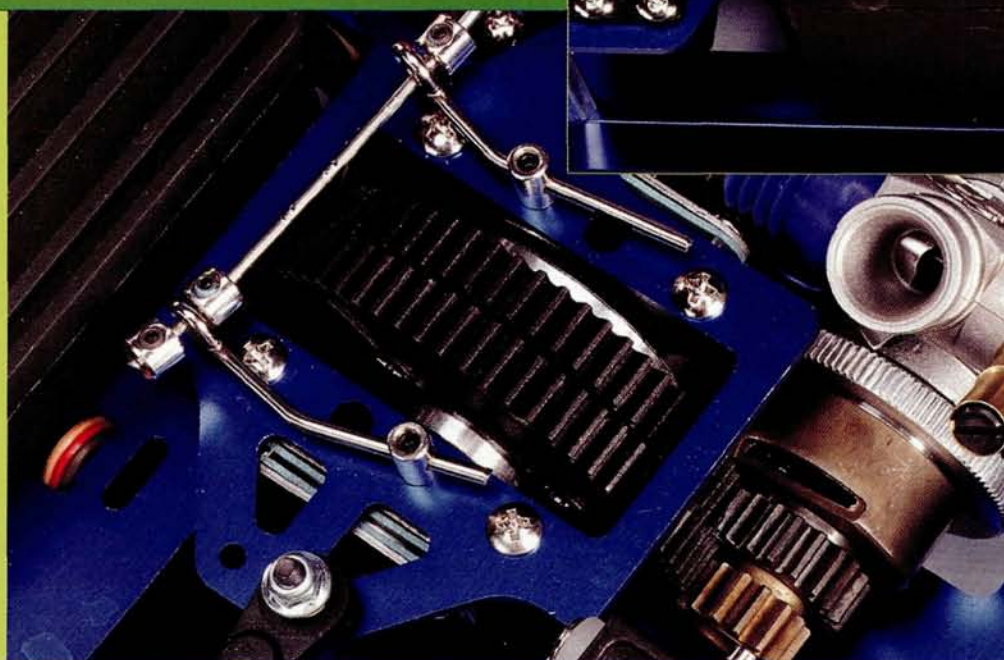
Instead of chevron tires, the Mammoth rolls out on lugged meats we describe as "Nike" treads. Like the more typical chevron rubber found on many other monsters, these tires are directional. This seems to be a great, multipurpose design; the numerous edges should provide good forward bite, the large voids should self-clean by tossing out the dirt and mud, and the generous flat tread tops should rip right along on the tarmac.



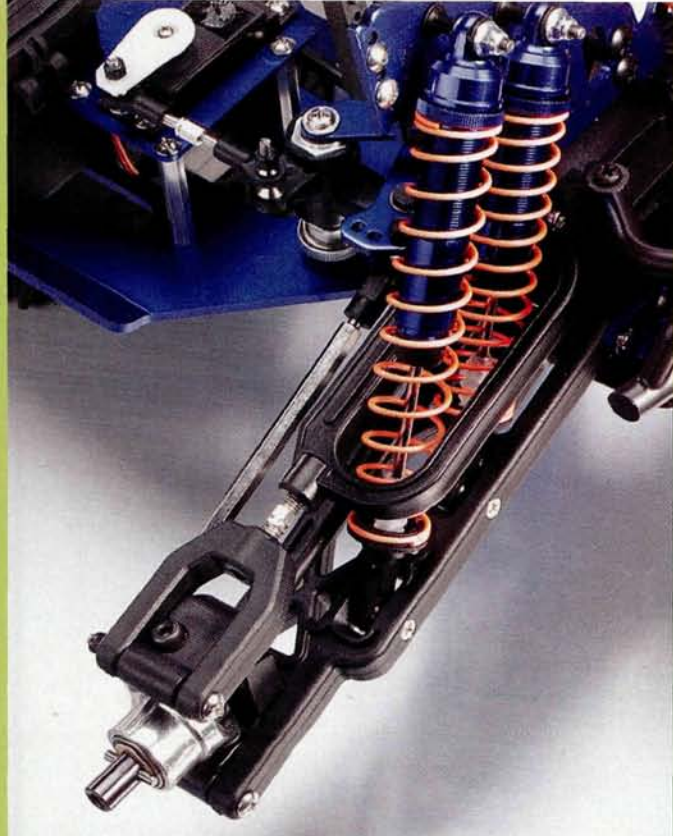
Flipped on its lid, the Mammoth shows off its sturdy framework. The blue-anodized aluminum chassis is 3mm thick, and cutouts lower the differential housings and the 2-speed transmission. The chassis's sides are radiused to increase the stiffness and strength of the chassis plate.



An enclosed radio box is a must-have for any nitro monster. Thanks to its roomy chassis, the Mammoth has an extra-large compartment for its Hitec receiver and battery.



The only way to get speed and acceleration from a truck this big is to install a 2-speed transmission, so we're glad to see that the Mammoth has one. The 2-speed puts the spin into a shaft-drive system borrowed from the X-Terminator; it's shown here with dual rotors. XTM says the production trucks will have three vented rotors.



For its 4-wheel independent suspension, the Mammoth uses upper and lower control arms with C-carriers. Two coil-over, fluid-filled aluminum shocks at each corner keep the truck in control, and the upper arm's adjustable link allows you to tweak the camber. The upper arms wrap around the twin shocks, and the hubs are cast aluminum; this looks like a durable setup. According to the XTM guys, the production version of the Mammoth will use silicone shock stops that look just like the real deal.



XTM specs Hitec's reliable Lynx Sport radio system for the Mammoth, and it didn't skimp on the steering servo, either. The truck uses the new "X175MG Torque Punisher" that has 175 oz.-in. of torque—and that's at 4.8 volts! It will be even stronger on 6 volts from 4 AA alkalines or a 5-cell receiver pack.

features

- 3mm blue-anodized aluminum chassis
- 4WD 2-speed drive train
- Gear differentials
- Rubber-shielded ball bearings
- 4-wheel independent suspension
- Adjustable wheelbase
- Eight, oil-filled aluminum shocks
- Hitec radio equipment with high-torque steering servo
- 50mph claimed top speed
- Disc brakes



The Mammoth's grease-filled gear differentials are O-ring-sealed to keep dirt out, but you can fill them with silicone fluid and the seals will keep the goo in. Universal-joint axles spin the front wheels, and dogbones get the job done in the rear.



XTM got the bigger-than-big-block bandwagon rolling with its 3-port, 24-7 engine that displaces .247ci. ABC construction, a dual-needle slide carb and a pull-starter are standard, and the Mammoth's mill features XTM's optional, oversize heat-sink head as standard equipment. The tubular manifold and aluminum tuned pipe are lifted from the X-series cars and trucks.

Everything looks right on this truck; the chassis appears strong, the suspension has loads of travel and plenty of damping and the 24-7 engine is already well-proven in XTM's other big-block machines. The Mammoth certainly is packed with all the right stuff, and as soon as we get our track-ready model, we'll fill you in on how mighty the Mammoth truly is. Keep your eyes open for a full "Track Test" in the next issue.

SOURCES

XTM RACING distributed Global Hobby Distributors (714) 964-0827; globalhobby.com.

reader's ride of the year

Dennis Branecky's quad-engine nitro puller

by John Howell

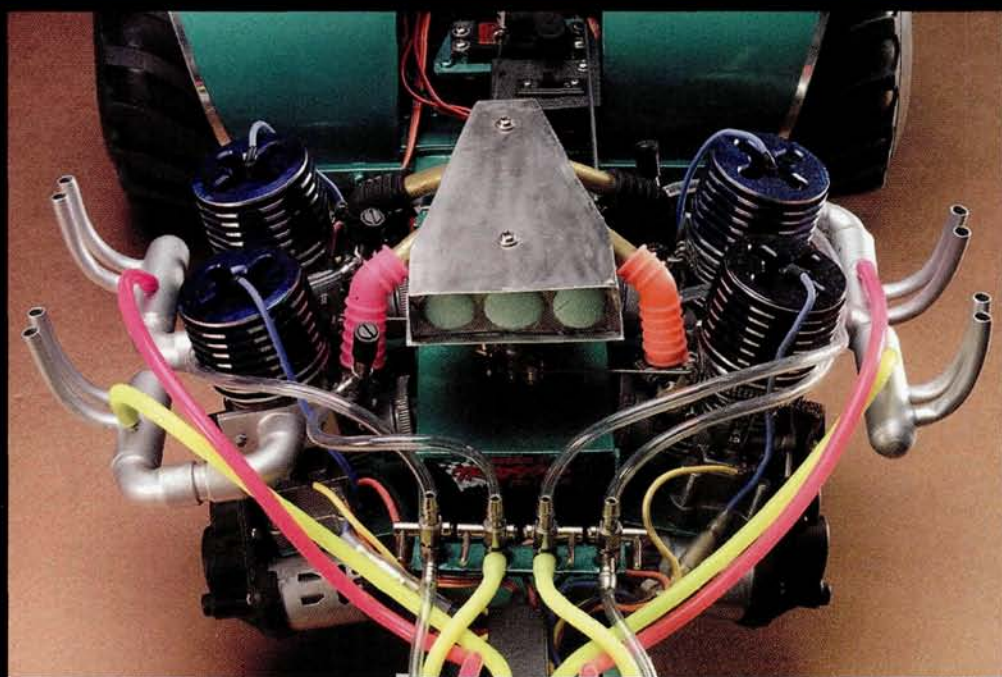
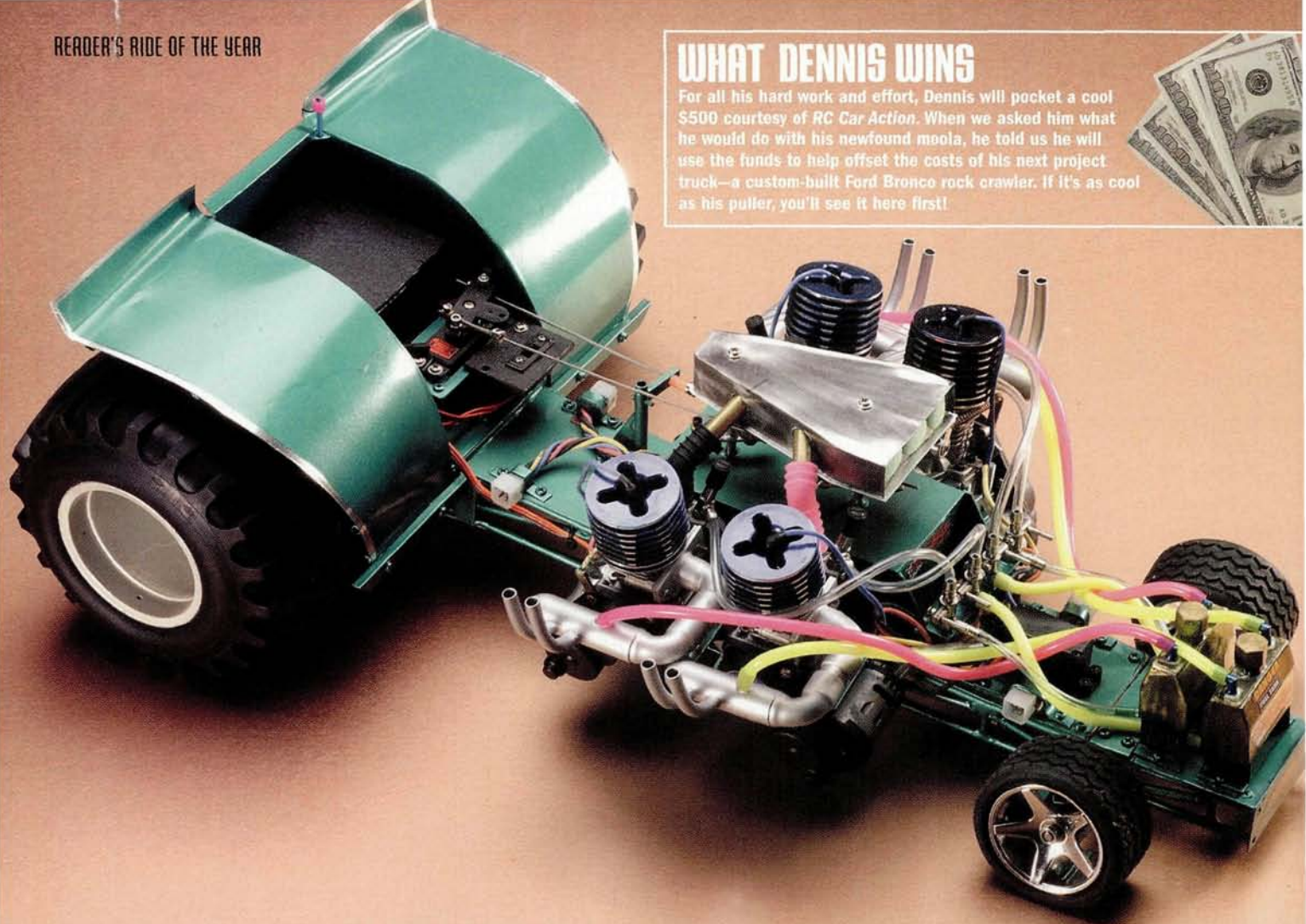




YOU GUYS ARE PRETTY CREATIVE INDIVIDUALS; we see proof of that every year when we have to narrow down the finalists for our Reader's Ride of the Year award. We picked from nearly 100 contestants the ride that we felt best reflects our readers' highly creative spirits. This year, the decision was a little easier thanks to Dennis Branecky of Dallas, TX. Dennis's wild-looking, custom-built, nitro-powered puller was hands-down the wildest creation that found its way into our mailbox all year. With its scratch-built chassis and four functional engines, this puller is decidedly unique. Ultimately, we felt that Dennis deserved the win simply based on its "Wow" factor. Every time we looked at his pictures, we all agreed, "Wow, that guy is nuts!" Congratulations, Dennis—job well done!

WHAT DENNIS WINS

For all his hard work and effort, Dennis will pocket a cool \$500 courtesy of *RC Car Action*. When we asked him what he would do with his newfound moola, he told us he will use the funds to help offset the costs of his next project truck—a custom-built Ford Bronco rock crawler. If it's as cool as his puller, you'll see it here first!



Four Traxxas TRX .15 engines, each with a homemade exhaust system, power Dennis's custom puller. All the engines are equipped with EZ-Start systems so Dennis won't develop a case of Popeye-arm from pull-starting four engines before each run. The engines can also run independently; depending on the power he needs, Dennis can run one, two, three, or all four.

Each pair of engines (the front pair and rear pair) drives its own inverted Traxxas differential (modified with a solid spool). The differential/spools are joined by a U-joint, and they spin a sealed drive shaft that goes back to the rear axle. When all four engines are fired up in unison, Dennis tells us that it sounds like a maniacal buzz saw while it's waiting to rip into the dirt!

OFFTRACK
2
months
TOTAL BUILDING TIME INCLUDING NIGHTS & WEEKENDS

The puller's fuel tanks are up front (one per pair of engines) and are made out of 3/4-inch flat brass stock. Dennis added an independent fuel shutoff valve for each engine. He made the shutoffs out of fish aquarium air valves!



the specs according to Dennis

Wheelbase 17 in.

Width (F/R) 7.5/13.25 in.

Weight 236 oz.

Chassis Brass tubes of various sizes

Engines Traxxas TRX .15 (4)

Exhaust Custom-made header

Steering servo JR Z250

Throttle servo JR Z550

Tires (F/R) Pro-Line Striker III/OFNA Monster Blazer

Total building time: two months; every night and on weekends.
How did you get into RC?: I got into it about three years ago after my brother-in-law Ed got me hooked on the hobby. My first truck was a Traxxas Nitro Stampede.

Project parts: I used spare parts from a Thunder Tiger V-Spec 1/8-scale buggy, as well as Traxxas T-Maxx and Stampede parts. There is also a whole lotta brass in there!

Total length of brass tube used: I must have used at least 4 feet.

Hardest part to make: I'd have to say the rear-axle assembly because of the way I had to construct the axle housings to match them to the Traxxas T-Maxx differential—or the throttle/dual brake linkage; it's a toss-up!

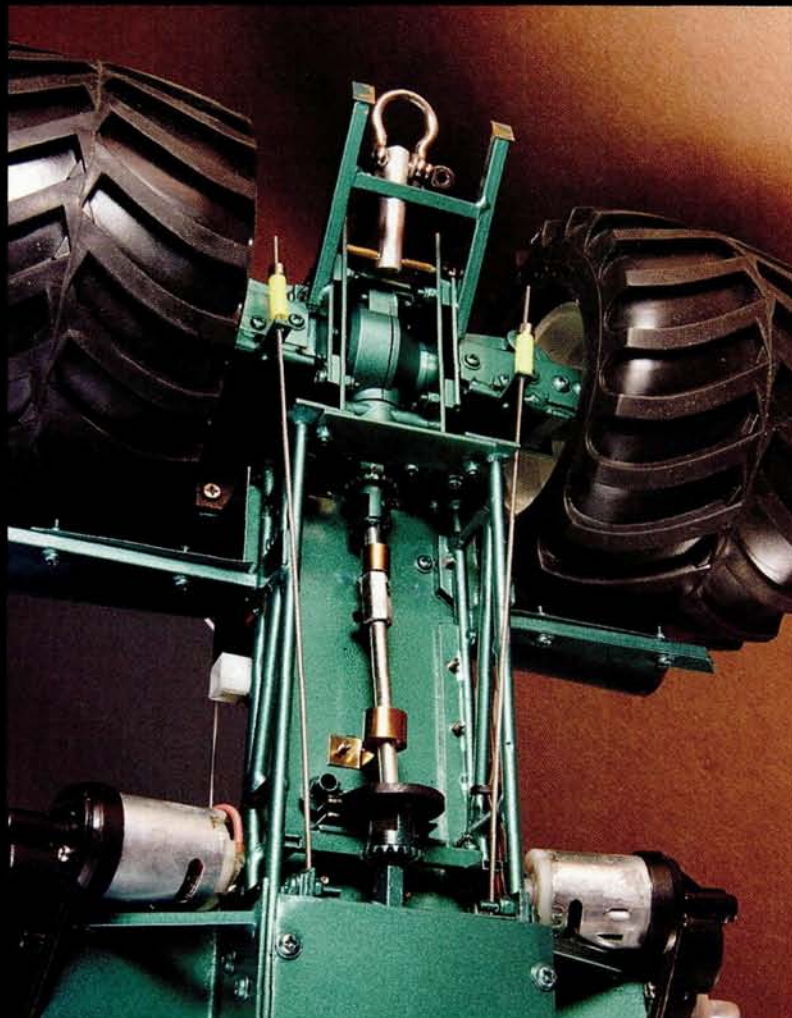
If I had to sell it: how much would you give me for it? [laughs] I'd probably sell it for at least \$1,000.

Why green?: because it was the only full bottle of paint that I had.

[laughs]

Best advice for other pulling fans:

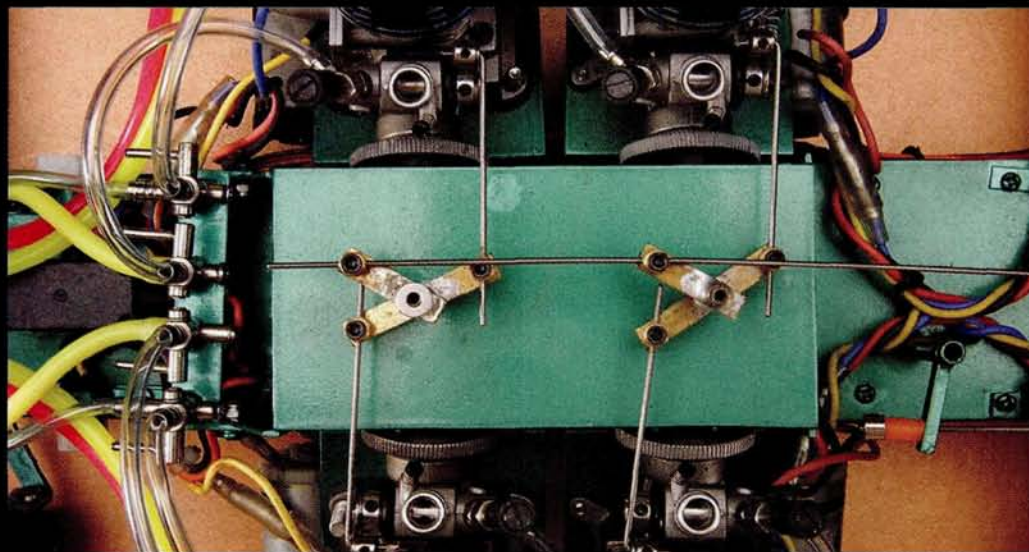
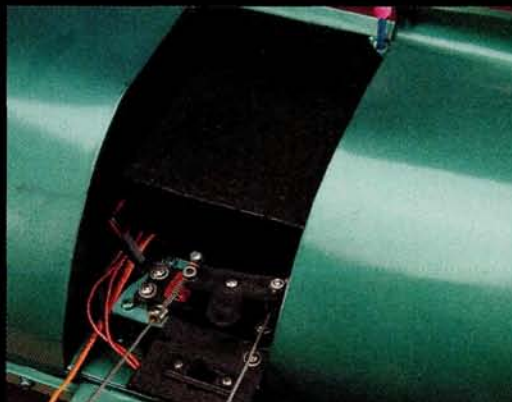
be creative. You can accomplish anything if you put your mind to it. And remember, horsepower is really the end objective; you can put in as much power as you want. Technically, I could have put four .21s in there, but all I had lying around were the four .15 engines.



The puller's entire frame is made of 0.200-inch-thick K&S brass tube with liberal use of brass-tube cross-member supports to help make a more rigid chassis package. The rear axle is based on a Traxxas T-Maxx differential that's also equipped with a differential spool to provide equal power to both wheels. On each side of the differential housing, Dennis made square, custom axle housings out of a 3/4-inch solid-brass strip and then bolted the housings directly to the Traxxas differential. The rear tires are from an OFNA Monster Pirate, and according to Dennis, they give gobs of traction. Of course, the rig's sheer weight is its primary traction enhancer; it weighs in at just under the heavyweight limit—14.75 pounds!

OFFTRACK
4 FEET
 TOTAL LENGTH OF BRASS TUBE USED

The puller has three independent brakes: a center driveline brake (an 1/8-scale style brake) and two separate rear axle brakes. The unique dual-brake system on the rear axle is linked to the steering system. When Dennis steers the puller to the right, a linkage system activates a brake on the right side of the rear axle and vice versa when he steers left.



SOURCES

K&S ENGINEERING (773) 586-8503; ksmetals.com.

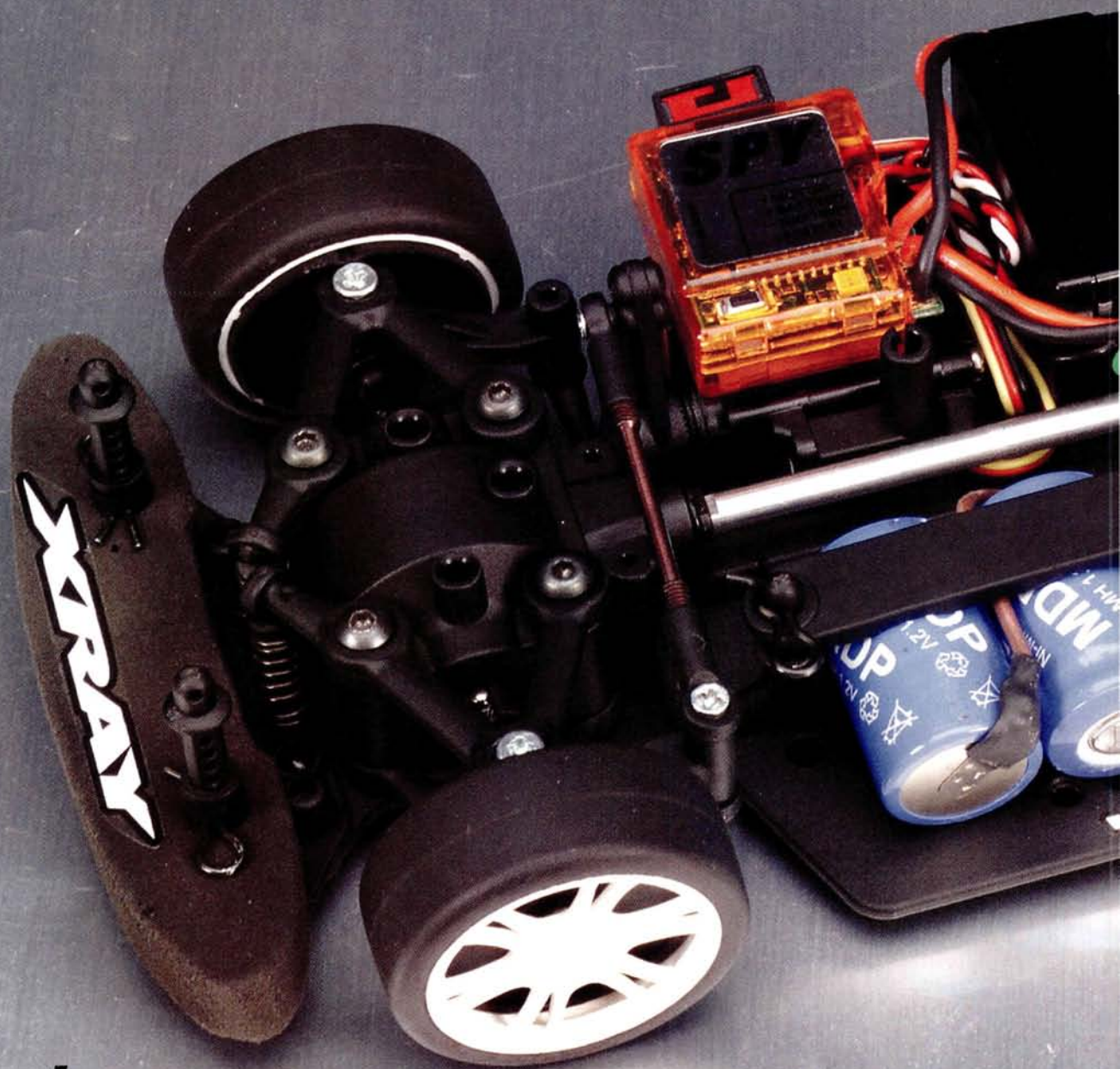
OFNA RACING (949) 586-2910; ofna.com.

THUNDER TIGER/ACE HOBBY DISTRIBUTORS INC (949) 833-0088; thundertiger.com.

TRAXXAS CORP. (888) 872-9972; (972) 265-8000; traxxas.com.

XRAY M18

by Matt Higgins



Tiny tourer

The current crop of $\frac{1}{18}$ -scale cars has many of the features found in larger-scale, racing-bred machines. Yet, it hasn't been until XRAY unveiled its new M18 micro that a $\frac{1}{18}$ -scale machine has had such technological features as fully independent front and rear suspensions and a shaft-driven 4WD drive train. Adding to the ground-breaking suspension and drive-train design are inboard shocks with multiple

mounting positions and an adaptable motor-mounting position that opens up the option of moving the motor above the 4mm-aluminum shaft to make room for 6-cell power.

A finalized M18 kit wasn't available, but we were able to get our paws on XRAY's latest preproduction car for a "First Look." Read on and see what this micro is all about.



SPECIFICATIONS

MANUFACTURER XRAY

MODEL M18

PRICE \$99

DIMENSIONS

Wheelbase 5.9 in. (150mm)

Width (F/R) 3.9 to 4 in. (98 to 101mm)/4.1 to 4.2 in. (104 to 107mm)

WEIGHT

Total, as shown 13.8 oz. (392g)

CHASSIS

Type Molded flat plate with raised center spine

Material Composite plastic

DRIVE TRAIN

Type Shaft-driven 4WD

Primary 36T spur/23T, 21T, 19T, 17T pinions

Primary ratios 1.57:1; 1.71:1; 1.89:1; 2.12:1

Drive train ratio 2.5

Final drive ratios 3.93:1;

4.28:1; 4.73:1; 5.3:1

Drive shafts Molded plastic with universal joints

Differentials Gear with plastic outdrives

Bearings Steel-shielded ball bearings

Suspension Upper and lower A-arms

Shocks Friction-type coil-over

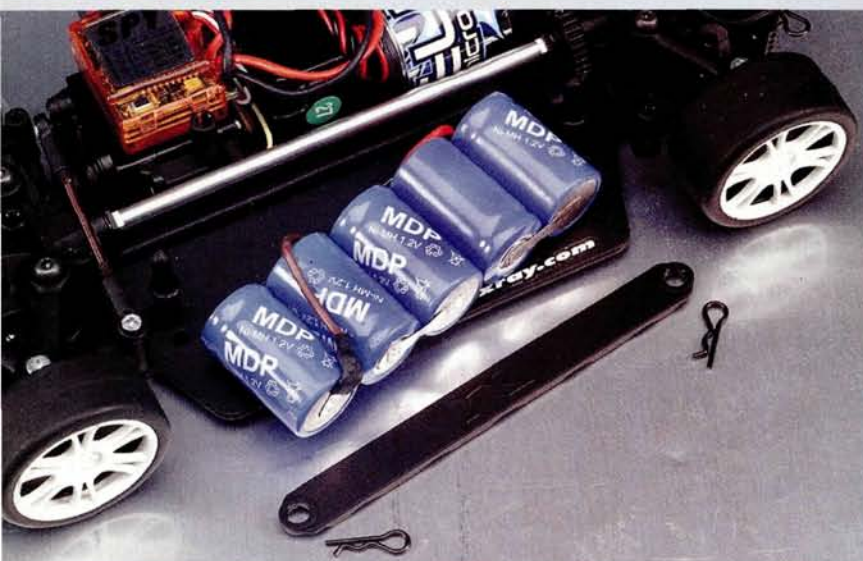
WHEELS

Type Two-piece, split 6-spoke

TIRES

Type Soft rubber slicks





The M18 gives up nothing with its small size. It's not only easier to work on than its $\frac{1}{18}$ -scale competition but is much easier to work on than many $\frac{1}{10}$ -scale touring cars. The standard setup will call for a 5-cell pack on the left and the motor on the right. An optional chassis layout will allow a 6-cell saddle pack to be installed with a new motor mount that moves the motor above the drive shaft. In the standard configuration, a battery strap and two clips retain the pack.



The shocks rely on friction instead of fluid for damping and have coil-over springs. The top mounts are fixed, but there are two lower mounting points for each shock. You can easily change their position without tools.

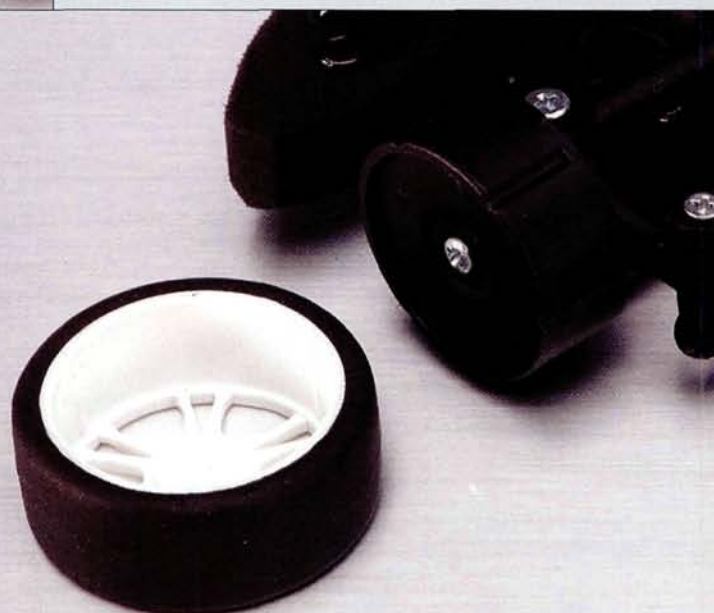
Because of its 150mm wheelbase, M18 owners have a good selection of micro bodies to choose from. The body posts are highly adjustable, so getting those bodies to fit won't be a problem.



To adjust the motor mount, loosen two screws on the bottom of the chassis and slide the mount for different pinions.



The M18's gear differentials are simple and durable—a good thing because it's sure to see more than its fair share of high-impact indoor action. The bearings are steel-shielded and spin on light oil instead of thick, speed-robbing grease.



The M18's tires and rims are completely interchangeable with those designed for the HPI $\frac{1}{18}$ -scale micro cars. This means that a whole bunch of tire and rim combinations are already available. The M18 has two width settings that can be selected when sliding the outer rim onto inner rim.



The 4mm-aluminum drive shaft is notched at each end to fit perfectly into the input cup of each differential. The 36-tooth spur gear is mounted directly on the drive shaft in front of the rear differential.



The M18 has a simple but effective steering setup. It consists of only two links: a drag link that connects the servo's output arm to the left hub and a center link that connects the two hubs, so the wheels turn in unison. The front end also has six degrees of caster to increase straight-line stability.



The flat-piece chassis is molded from composite plastic. Its underside is perfectly smooth with countersunk screws and a molded-in center spine to increase the chassis' rigidity for better, more precise handling.

features

- Molded composite-plastic chassis
- 4WD, shaft-driven drive train
- Gear differentials
- 4-wheel independent suspension
- Adjustable front and rear widths
- Adjustable body mounts
- Accepts current micro bodies
- Accepts current micro wheels
- Ultra-low center of gravity
- Universal axles
- Aluminum drive shaft



The 4-wheel independent suspension uses upper and lower A-arms in the front and back. As a matter of fact, the front and rear gearboxes are also the same, making for a very low parts count—always a bonus.

parts plethora

It's always nice when a new car comes out, and it instantly has a selection of option parts available. This is the case with the M18 because XRAY designed its new car to be compatible with the abundant supply of micro running gear. So there's already a nice selection of motors, ESCs, bodies, tires and rims to choose from. Here's a list of some manufacturers that have parts (originally for the HPI Micro RS4) that fit the M18:

- HPI—bodies, wheels, tires and motors
- Novak—speed control
- Pro-Line—bodies
- Team Orion—motors, batteries, tires, speed control
- Team Trinity—motors
- TRC—tires

The M18 is a no-compromise microcar that proves "big car" features don't have to be sacrificed when size is dropped down to $\frac{1}{8}$ scale. The 4WD system feels super-efficient, and the 4-wheel independent suspension looks as if it will deliver excellent handling. Even with just a first look, it is easy to see that the M18 might be a tiny tourer, but it's no toy.

SOURCES

HPI (949) 753-1099; hpiracing.com.

PRO-LINE (909) 849-9781; pro-lineracing.com.

TEAM ORION INC. (714) 694-2812; team-orion.com.

TRINITY PRODUCTS INC. (732) 635-1600; teamtrinity.com.

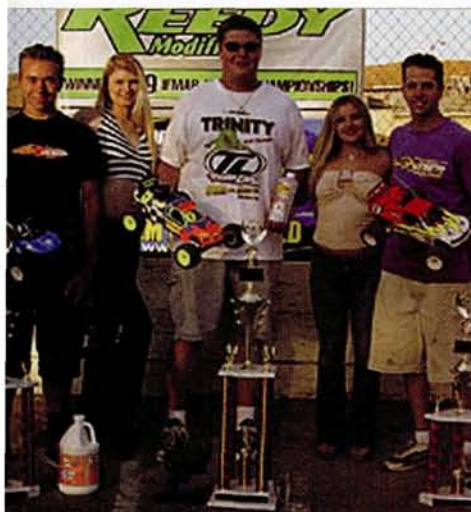
TRC distributed by Trinity Products.

XRAY distributed by Serpent USA; (305) 639-9665; teamxray.com.

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BATTERIES
FUSIONBATTERIES.COM

BY THE RC CAR ACTION TEAM



Team Losi wins big at Reedy Truck Race

Team Losi trucks won each of the six classes at the annual Reedy Truck Race held at Hot Rod Hobbies in Saugus, CA. Adam Drake won Expert Gas Truck with his signature Team Losi Triple-XNT, and teammate Ryan Cavallieri dominated the triple A-main format to win the Electric title with his Triple-XT.

SITE SEEING



formula1-rc.com

This site is for anyone who is into F1 RC racing. There are several setups for various F1 cars, news about hot new hop-ups and a schedule of F1 races. The photo galleries of custom F1 cars will give you ideas for your next project.

BOARD WALK

FROM THE
RADIOCONTROLZONE
.COM BULLETIN BOARD

Motor brushes?

YZ85RIDER: How do I know when to get new brushes?

ZIGGO: When the motor starts to lose performance. You will also notice that the brushes turn a bluish color; that means they have been overheated.

APRILIARACER: Replace your brushes when they are discolored.

Battery help

FIDO: My NiMH 3000 and 3300 batteries get really hot when I charge them. I charge at 4 to 4.5 amps at the most. What's the problem?

LOSIXXX213: You can use a fan to cool them while they charge.

BENLOSI: Try charging the NiMH at a lower amp rate. Your charger might not be able to charge NiMH batteries.

Chrome paint

GORD: I have found that chrome paint chips off bodies very easily. Is there anything I can do to fix this?

HAUNTEDMYST: Pull your airbrush back 6 to 10 inches so the paint is actually hitting the body dry. It's tempting, but do not put the chrome on too thick.

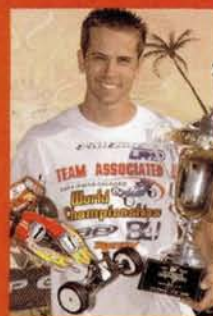
ADRCRACING: Lightly spray the Alclad at 12 to 15psi, which will cause the paint to dry fast! Take your time, but the more chrome, the better. I use a light dusting of FasKolor white to back the chrome, and I then seal the body with FasKolor sealant.

BE HEARD! LOG ON AT
RADIOCONTROLZONE.COM

IFMAR OFF-ROAD WORLDS!

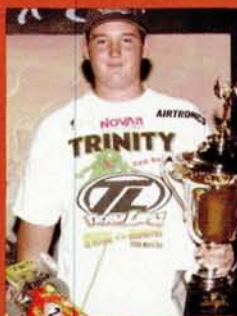
Associated wins 2WD ...

The big guns in off-road split the wins at the IFMAR Off-Road Worlds in Clearwater, FL. Team Losi's Ryan Cavallieri won the 4WD title with his Triple-X4 Graphite Plus and was followed by Brian Kinwald, Mike Truhe and six other guys wheeling Losi's. Team Associated's Billy Easton was the only guy not on the L-train, and he drove his Yokomo to eighth overall. But 2WD was a different story, and



Billy Easton

Billy was the man to beat (but he proved unbeatable). Back-to-back wins in the first two A-mains sealed



Ryan Cavallieri

Losi takes 4WD

the deal and gave Billy his first-ever IFMAR title—and proved that the B4 is unquestionably the best RC10 yet. Brian Kinwald and Associated's Mark Pavidis rounded out the top three. Stay tuned for complete coverage in the next issue!

Dawson dominates stock Nats



Ryan Dawson hasn't raced for a while, but he quickly shook off any ring rust when he returned to racing at the ROAR Stock Nationals. He won all three classes at the Nats, which were held in Portland, OR. Dawson may still need to prove he is fast enough to hang with the Modified big boys to earn a factory ride, but he is well on his way.

Tamiya Champ Series winners

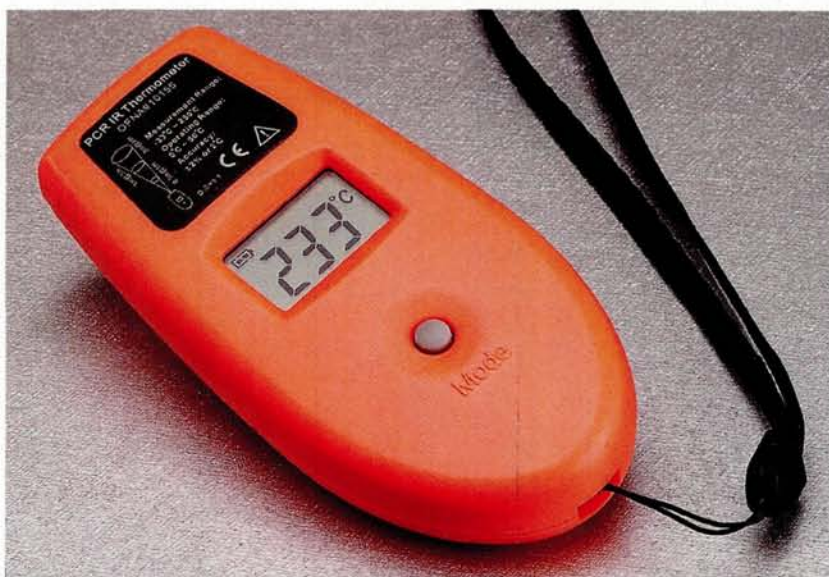
The annual Tamiya Championship Series finals are held at Tamiya USA each year for amateur drivers to compete with various Tamiya racecars. The ultimate prize in each class is a Tamiya-paid trip to Japan to represent the U.S. in the TCS Worlds. We have heard that the U.S. racers are treated like royalty while in Japan; they visit several RC factories and are given a special tour of the Tamiya facility. This year's winners are Rod Canare (GT-1 class), Michael Rydwell (GT-2 class) and Steve Williams (F-1 class). Look for the TCS race coverage in a future issue of RC Car Action.



"I don't even care if I blow out at the TCS Worlds in Japan. I'm just stoked to be going."

Rod Canare, after winning a paid trip to Japan for the TCS Worlds.

SPEED SHOP



OFNA PCR infrared temp gauge

OFNA claims that its new, compact infrared (IR) temperature gauge is not only highly accurate and easy to handle, but it's also equal in quality and function to the \$300 units on the market. The only major difference is that the OFNA temp gauge sells for \$40! The built-in 3:1 sensor is specifically designed to be accurate within 3 inches of your engine's glow plug, and the gauge measures temperatures between 27 to 428 degrees Fahrenheit.

PCR IR temp gauge—10155; \$40.

OFNA Racing (949) 586-2910; ofna.com.

ACER RACING Nexcell NiMH AA batteries

Acer Racing's ultra high-capacity AA batteries let you race longer before your transmitter starts beeping for more juice. The nickel-metal-hydride cells squeeze 2100mAh into the skinny little bodies, and they're great for AA-powered microcars such as HPI's Micro RS4.

Nexcell NiMH AA batteries—2100aa4; \$8/pack of 4.

Acer Racing (310) 472-8090; acerracing.com.

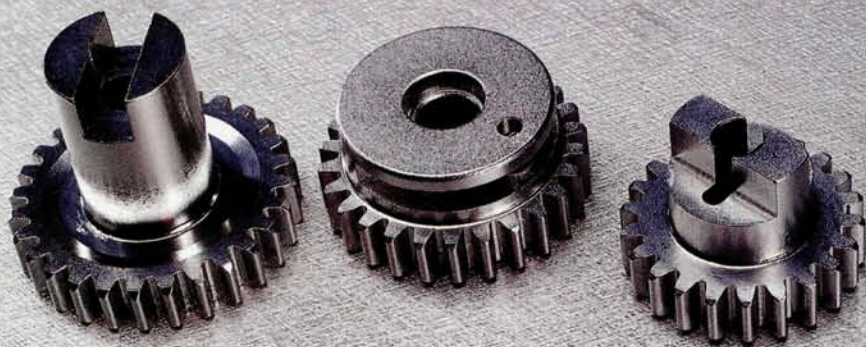


WALLER RC RACING Power Adapters

According to Don Waller of Waller Racing, these new Power Adapters help boost low-end power by lengthening the distance between the header and the pipe. A nice bonus is that you won't have to worry about blown-out silicone couplers ruining your run, thanks to the adapter's spring-loaded coupler. Waller offers Power Adapters for 1/10-scale and 1/8-scale on- and off-road cars. The 1/8-scale, off-road version is shown here.

Power Adapters—item nos. vary; \$37 to \$43.

Waller RC Racing (562) 421-5690.



GOLDEN HORIZONS RACING Aluminum T-Maxx gears

For all you Maxx racers (or those of you who are just looking to bulletproof your Maxx's tranny), Golden Horizons now offers lightweight gears that are made from ultrastrong 7075 T7 aluminum. The gears are available separately, or you can get a package deal that saves you \$10.

Primary gear reverse 22T—02201S; \$30.

Primary gear forward 28T—02202S; \$30.

Output gear 26T—02203S; \$30.

Complete aluminum gear set—02204S; \$80.

Golden Horizons (604) 331-2526; ghobby.com.

SPEED SHOP

FANTOM RACING Factory Works .21 tuned pipes

Fantom Racing's motocross-inspired Works pipes are now available for .21 engines. The steel, factory-looking pipe resonates better than an aluminum pipe, and that makes the pressure pulses stronger to increase performance. In addition, steel retains heat better than aluminum, and a hotter pipe helps an engine burn fuel more efficiently for increased power and better fuel mileage.

These pipes are also super tough; you won't bend the stinger on one of these bad boys. Two styles are available: a single chamber (for more torque) and a dual-chamber version (for more rpm). Both pipes are available in Fantom's natural-steel finish that shows the "bluing" from the welds for that "factory" look, or you can choose a clean-looking, shiny nickel finish.

Works single-chamber pipe (natural finish)—item no. F20014; \$75.

Works dual-chamber pipe (nickel-plated)—F20017; \$85.

Fantom Racing (269) 649-9583; fantomracing.com.



OFNA

SNR Pocket Reamer

Check out this handy little pocket reamer from OFNA. The reamer tip unscrews from the body of the handle and is then inverted and screwed back into the handle to form the tool. It's sharp, it cuts holes and it's reasonably priced. What more could you ask for?

SNR Pocket Reamer—38505; \$25.

OFNA Racing (949) 586-2910; ofna.com.



PRO-LINE RACING

40 Series Velocity wheels

If you like racing your T-Maxx, then you'll be glad to know that Pro-Line has released lightweight 40-Series Velocity wheels and Bow Tie tires. The Bow Ties work well on moderately hard-packed and loamy track conditions. Thanks to the reduced tire sidewall

on the 40-Series tires, they tend to have less occurrence of "rollover" through turns, and that helps your truck handle more consistently.

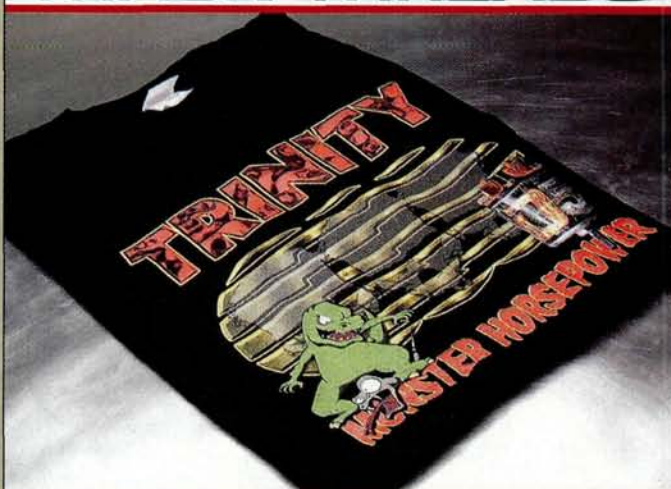
40-Series Velocity wheels—2669-02 (yellow)/2669-04 (white); \$15/pair.

40-Series Bow Tie tires—1113-0; \$25/pair.

Pro-Line (909) 849-9781; pro-lineracing.com.



TRACK THREADS



TRINITY Monster Horsepower T-shirt

It's time to hook up your wardrobe with a new T-shirt. Trinity's newest Monster Horsepower short-sleeve T-shirt (in fuel-blending black) features logos on the front and the back. It comes in sizes large through XXXL.

Monster Horsepower T-shirt—TRI80010 (L), TRI80011 (XL), TRI80012 (XXL), TRI80013 (XXXL); \$29.99 to \$32.99.

Trinity Products Inc. (732) 635-1600; teamtrinity.com.

UNDER THE HOOD

Ryan Cavalieri's Team Losi Triple-XT

EQUIPMENT USED

Transmitter: Airtronics M8

Servo: Airtronics 94357

Battery pack: Trinity GP 3300

Tires (F/R): Losi Taper Pin (silver/red)

Inserts (F/R): stock/Trinity

Body: Team Losi Fury

Receiver: Airtronics 92837

ESC: Novak GT7

Motor: Trinity D5 10x2

Gearing: 18T/86T



| SETUP | FRONT | REAR |
|---------------------------------|---------------------------|--------------------|
| Caster/anti-squat | Stock | 2 deg. |
| Camber | 0.5 deg. negative | 0.5 deg. negative |
| Toe-in | Zero | 2 deg. pivot block |
| Ride height | Arms level | Arms level |
| Bump-steer spacers | Zero spacers | — |
| Ackerman | Outside hole on bellcrank | — |
| Spindle height | Bottom | — |
| Spindle/carrier mount | Hole B | Hole A |
| Inner camber rod | Hole 3 | Hole 3 |
| Inner front camber-link spacers | 2 | — |
| Shock oil | Losi 30WT | Losi 32.5WT |
| Shock piston | 57 | 55 |
| Shock spring | Blue | Yellow |
| Shock limiters | 0.180 in. (inside) | — |
| Shock tower mount | 1 | 4 |
| Arm mount | Inside hole | Outside hole |
| Rear-hub spacing | — | Center |
| Battery placement | Middle | — |
| Swaybar | Thin | — |

FACTORY OPTIONS

■ Team Losi threaded-body shocks

■ Trinity finned aluminum motor mount

■ Trinity aluminum hinge-pin brace

■ Trinity aluminum rear arm mounts

■ Trinity aluminum front arm mounts

■ Trinity dummy transponder

■ Trinity aluminum body posts

■ Lunsford titanium front spindles

■ Lunsford titanium screws

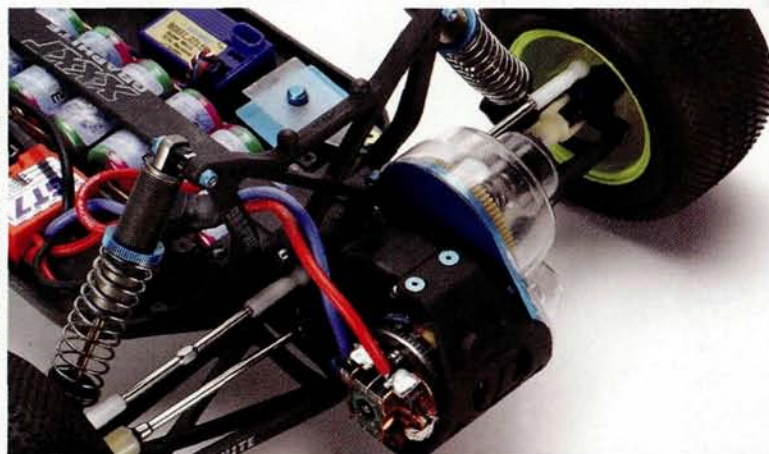
■ MIP shiny dogbones

■ Titan Tech aluminum rear hub carriers

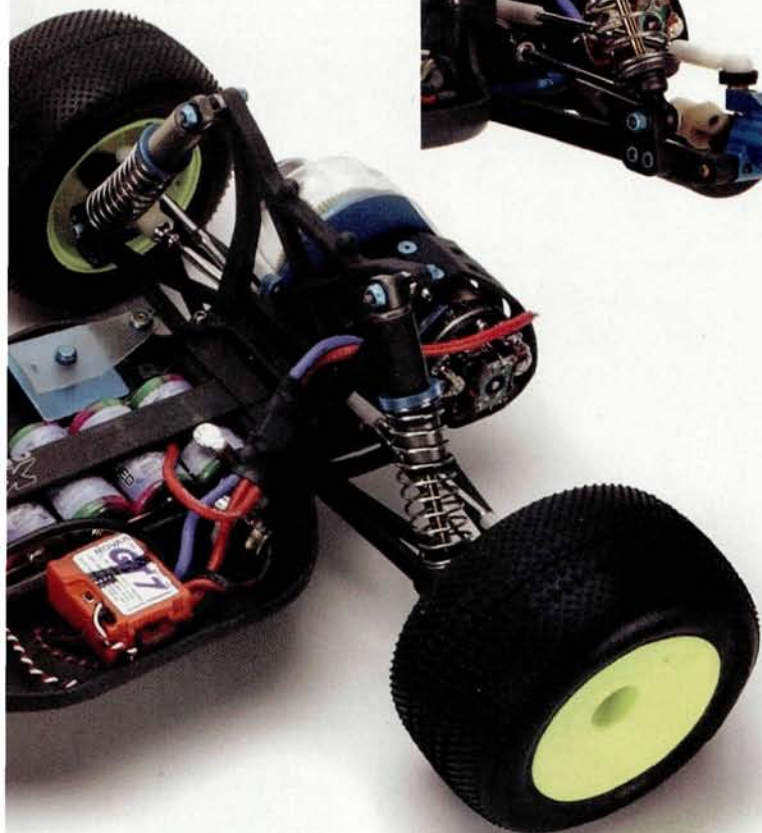


Trinity's aluminum hinge-pin brace and arm mounts strengthen the front suspension. Ryan used a thin Losi swaybar to reduce chassis roll on the high-bite Hot Rod Hobbies track. Check out the Trinity aluminum body mounts and Lunsford titanium screws.

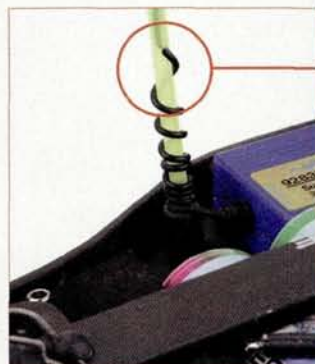
Ryan likes to run MIP's old-school, shiny metal, dogbone drive shafts and steel outdrives; he claims they provide smoother acceleration on blue-groove tracks. The Trinity aluminum arm mounts stiffen the rear pivot block and prevent breakage. That's a Trinity D5 10-turn double strapped to the Trinity finned aluminum motor mount.



Titan Tech's aluminum rear hub carriers will never break, so that's one less thing Ryan has to worry about. Ryan's truck is equipped with Losi's optional threaded body shocks; they are easier to adjust and come with super-tough titanium-nitride shock shafts. Those are Losi yellow springs with the powdercoat removed.

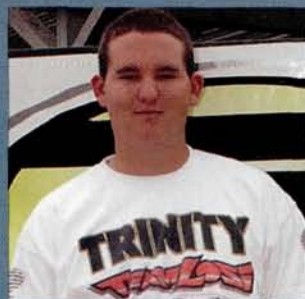


FACTORY DRIVER HOT MOD



Instead of passing the antenna lead through the antenna mount, Ryan made a small hole in the antenna tube and slid the antenna lead through the hole in the tube. This prevents the antenna from making contact with the graphite chassis, which is conductive and can potentially cause glitching.

5 QUESTIONS



DRIVER: Ryan Cavalieri

AGE: 17

LAST BIG WIN: Reedy Truck Race of Champions

SPONSORS: Team Losi, Trinity, Novak, Airtronics, Lunsford, MIP and Renblast Graphics

WHEN I'M NOT RACING, I LIKE TO: go boogie boarding at the beach

RC CAR ACTION: Congratulations on winning the Factory Truck Class at the Reedy Truck Race. Who was your toughest competitor at that event?

RYAN CAVALIERI: The toughest competitor was my teammate Brian Kinwald. He was TQ, after all. Brian might be my teammate, but that doesn't stop us from having battles at the track.

RCRA: What is your favorite racing class?

RC: I'd have to say 2WD buggies. That class has the fastest drivers by far, so that makes it the most challenging class.

RCRA: It seems as if you've won a lot of races recently. How about a recap of your successes this year?

RC: Let's see ... the Losi Race, the Sidewinder Race, the Hot Rod Shootout, and of course, the Reedy Truck Race. I won all those races this year and hope to win a few more.

RCRA: To what do you owe your recent successes?

RC: My Team Losi and Trinity teammates and my dad, who happens to be my mentor.

RCRA: Are you getting ready for the IFMAR Worlds? Do you think that you have a good shot at winning one of the classes?

RC: I think that I have a really good shot at 2WD. I've always done very well at that facility, and the new K2 buggies are fast!

RCRA: Let's make it six questions. Any predictions on who might finish in the top three in 2WD and in 4WD at the Worlds?

RC: I guess I've already included myself in this list, but I think that Brian Kinwald and Matt Francis are going to be very tough in both 2WD and 4WD.

Editor's Note: Obviously, we interviewed Ryan before the Worlds. As we go to press, Ryan is the new IFMAR 4WD World Champ!

SOURCES

AIRTRONICS
(714) 978-1895; airtronics.net.
LUNSFORD RACING
(541) 928-0587;
lunsfordracing.com.
MIP (626) 339-9007;
miponline.com.

NOVAK ELECTRONICS INC.
(949) 833-8873;
teamnovak.com.
TEAM LOSI distributed by
Horizon Hobby Inc.
(800) 338-4639; teamlosi.com.

TITAN TECH
(626) 960-0547;
ttracing@aol.com.
TRINITY PRODUCTS INC.
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teamtrinity.com.

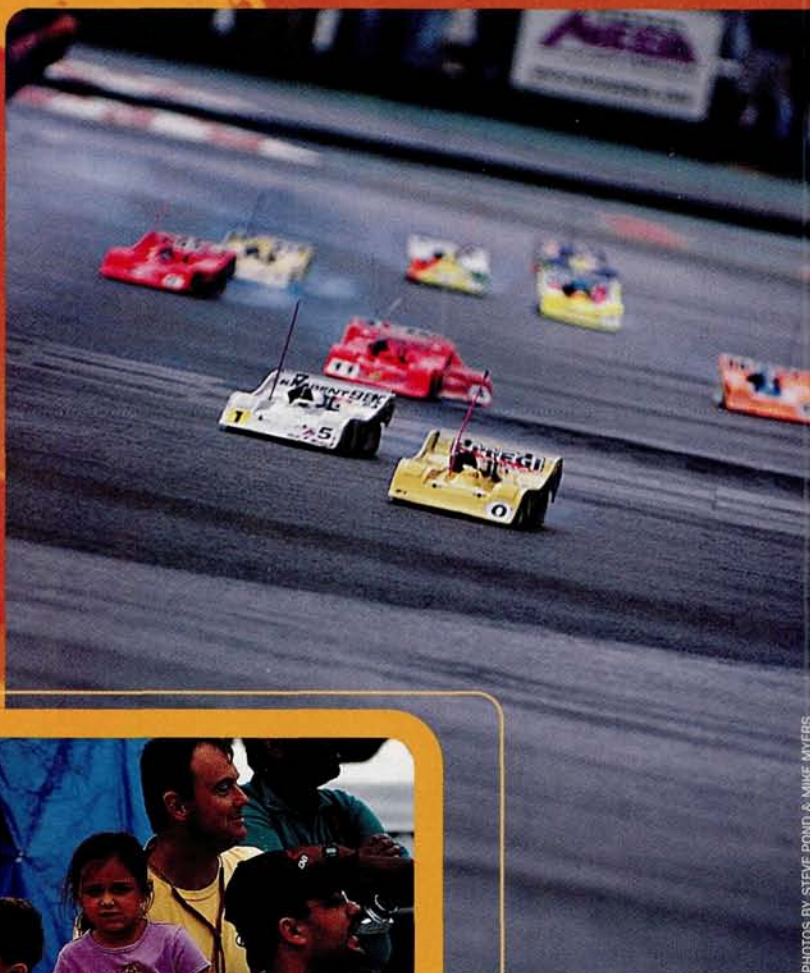
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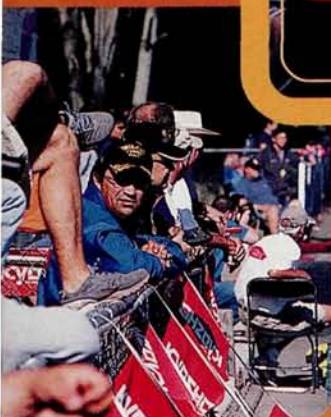
ON-ROAD IFMAR WORLD 1/8-SCALE CHAMPIONSHIP

by Steve Pond

THE 1/8-SCALE ON-ROAD CLASS AT THE WORLD Championship level is like nothing else in RC racing. This class is often referred to as the "Formula 1 of RC," and with good reason. It's a cost-no-object contest of the best of everything. The top drivers at this event are the world's best, and even the drivers in the middle of the pack are good enough to regularly take the A-main at any regional event. The skill level here simply eclipses anything you'll ever see on any track. It isn't just great drivers who make this event what it is; the hardware is also first-rate—and then some. The cars are usually the latest models, or they are prototypes that feature the newest technology. The number of engines available to the top drivers is usually in the double digits, and the tire foam flies so fast and furiously off the tire-cutting machines that they have to cart away the waste in 55-gallon drums.

This is the oldest form of organized RC car competition, and it's the one that the manufacturers and the world's best drivers take the most pride in winning. This is the oldest class of International competition, with champions listed back to 1977. Although the first 1/8-scale On-Road World Championship under the International Federation of Model Auto Racing (IFMAR) wasn't held until 1981, it's still the oldest—and most hotly contested—class among the RC racing elite.





Left to right: Aki Suzuki of Kyosho, Stephan Gandini of GRP, 1/8-Scale World Champion Lamberto Collari and Andrea Rossi of Sirio celebrate victory at the 2003 IFMAR World Championship.

COLLARI WINS NUMBER SIX!

TRACK ACTION

A bare minimum of a week of practice, qualify and running of the lower finals all culminates with the finals—the **last stand** for the 10 fastest drivers. The lineup included top U.S. drivers **TQ Josh Cyrul** and Ralph Burch Jr., who was the fastest driver bumped up to the A-main. Daniel Elasi of Italy and former world champion Adrien Bertin of France slotted into the second and third grid positions ahead of the then **five-time world champion Lamberto Collari**. Shimo of Japan slotted into sixth, and France's Frank Bestel started seventh on the grid. Thailand's Surikarn Chaidasuriya, the current world champion in the ISTC class (electric touring) bumped up twice from the 1/4 final to start eighth. Surikarn is relatively inexperienced with 1/8-scale on-road cars, and he missed all of practice and two of the six rounds of qualifying. That would be a **virtual death sentence** to most drivers, but he drove his way to the final by using his remaining qualifiers and winning a couple of bumps. It wasn't the easiest way to get there, but he did make the show. Oliver Mack of Germany and Tsuguo Kitade of Japan filled the last two grid spots.

At the tone, **Cyrul exploded off the line** and pulled out to the lead, followed by Burch, Elasi, Chaidasuriya and Shimo. The tune on Bertin's car was a little off the mark; his car flamed out while sitting in the starting box. He restarted it and made it out on the lead lap, but he was nearly 17 seconds back before he completed one lap. Cyrul and Burch had virtually identical early laps, but a mistake by Cyrul on lap five let Burch by for the lead.

Burch pulled away strongly, and although it looked as if he was checking out, nobody really noticed Collari **sneaking up** through the field. Burch was running with more than half his laps in the middle 19-second range, but Collari picked up a 1/10 here and half a second there. Meanwhile, Cyrul, who had run so well early on, didn't make it into the pits for his second fuel stop, and that dropped him out of contention with a lap that was just over a minute long while he was being refueled and restarted.

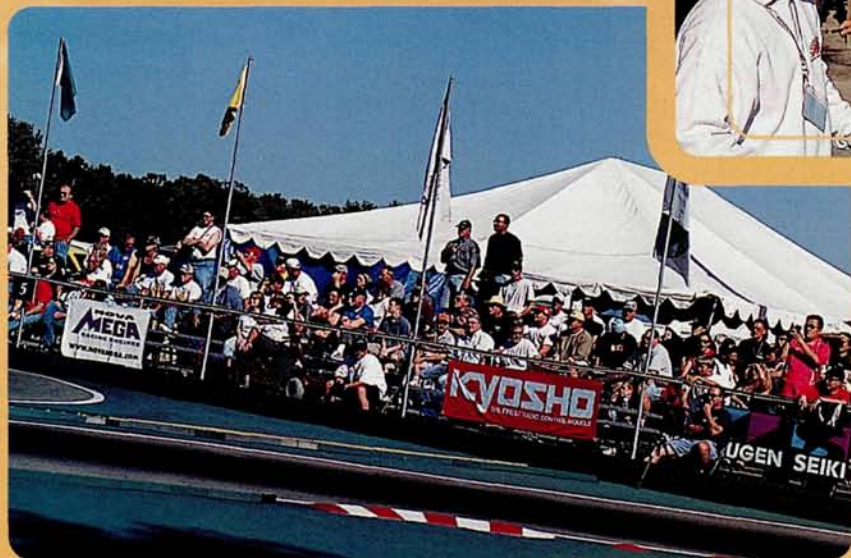
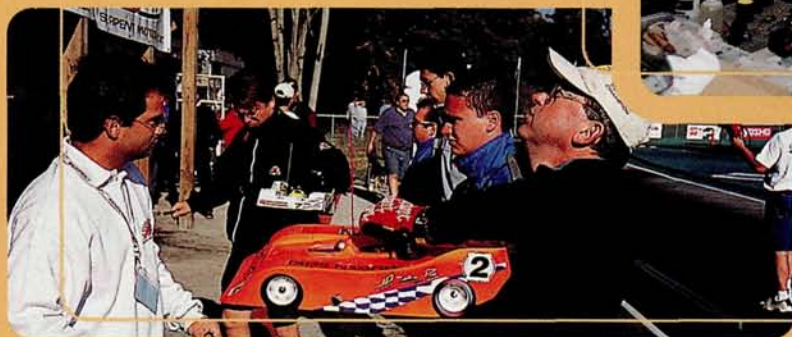
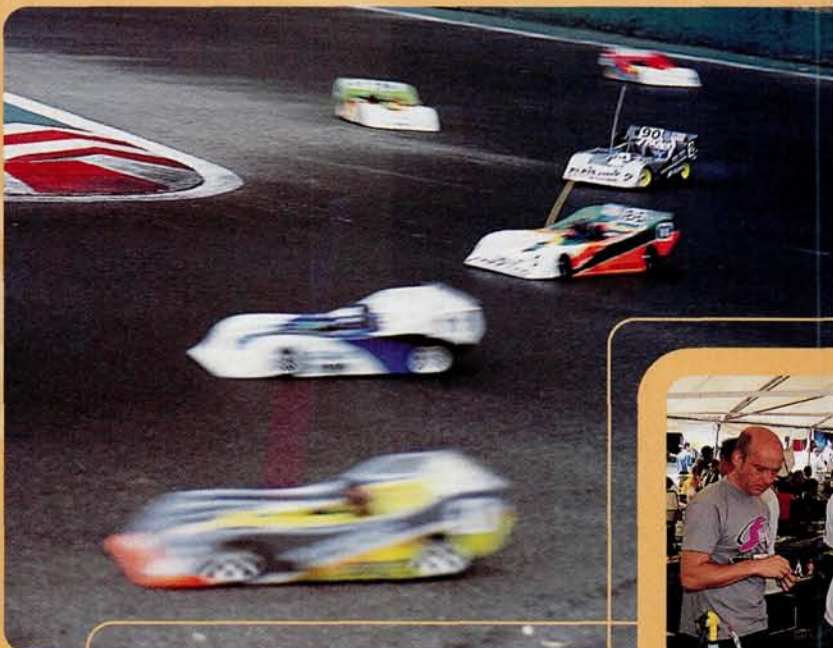
Later, as Burch and Collari both neared the 80-lap range, **Collari pulled within striking distance**. On lap 77, Burch lifted off the throttle on the back straight to avoid what would be for him a race-ending collision with an upside-down car, but Collari was able to come through at full clip because the accident had cleared by the time he got there. Collari closed up the lead on lap 82; Burch was slowing slightly from tires that were pretty worn. Collari pulled up on Burch at the end of the back straight, and after a little **fender rubbing**, Collari pulled out to a slight lead. Burch momentarily regained the lead 10 laps later while Collari was in the pits for a tire change, but he lost it to Collari when he stopped for a fresh set of tires. Two laps

later, Burch backed the car into the boards in the infield and broke a shock shaft. The car was repaired and back on track a little more than 3 minutes later, but the **damage had been done**; Burch finished seventh overall.

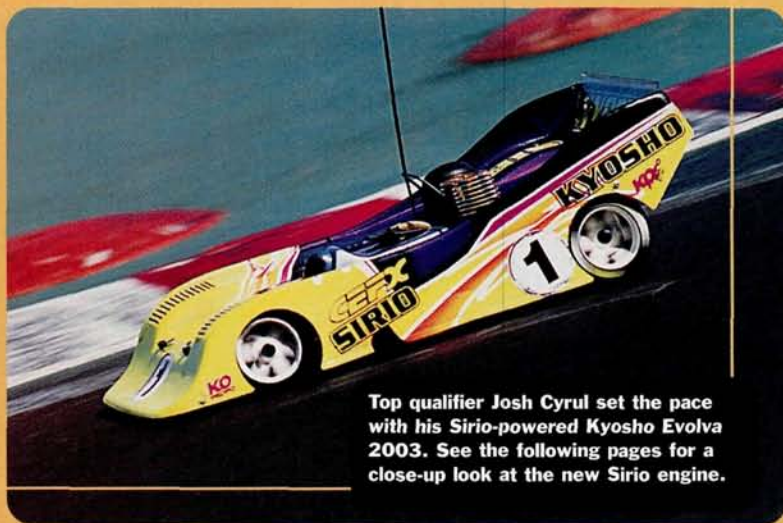
Surikarn made a strong charge toward the front, but at about the same time, Burch's gremlins struck, Surikarn's misfortune started. A litany of mechanical maladies that culminated with stripped spur gears finally put him out of the race, but not before he had served notice that he's a future contender in this class.

Italian Daniel Elasi's laps were hand counted during the event, so it was difficult to follow his progress, but he managed a good race. According to track officials, he scored a second-place finish.

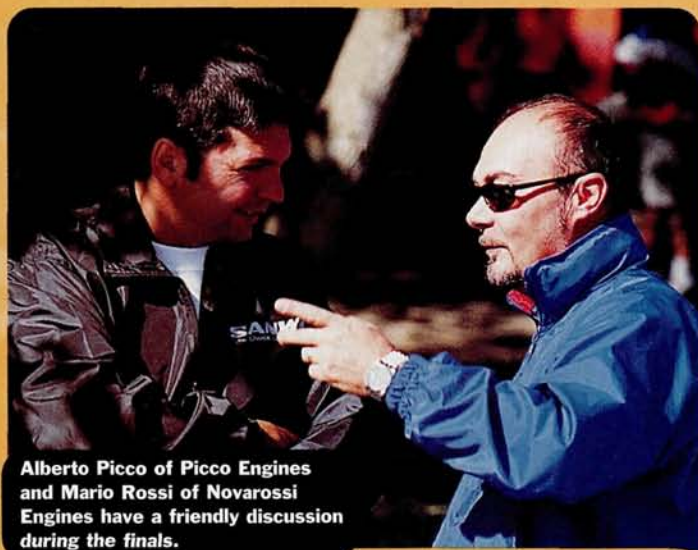
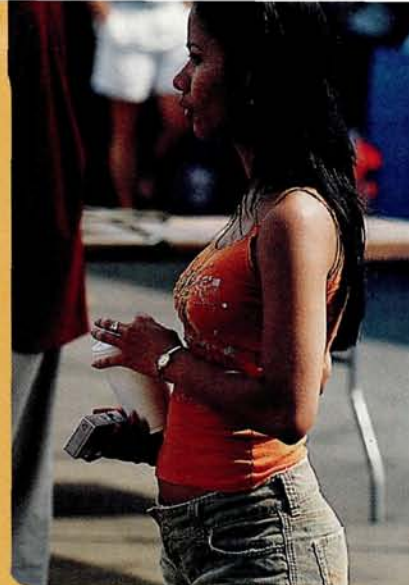
A little after halfway, Collari settled into his groove, and everyone else was basically along for the ride. At the conclusion of the eventful final, **Collari** crossed the stripe to win his **sixth world championship** in this class.



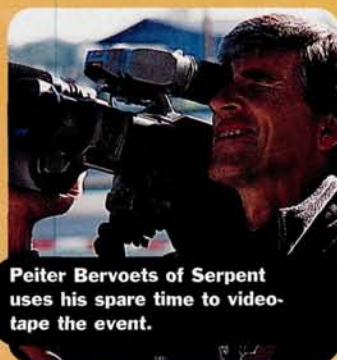
The Mugen USA crew: Chad Bradley, Tim Long, Mikio Shimizu and Kris Moore take a break from their racing efforts to watch the racing action.



Top qualifier Josh Cyrul set the pace with his Sirio-powered Kyosho Evolva 2003. See the following pages for a close-up look at the new Sirio engine.



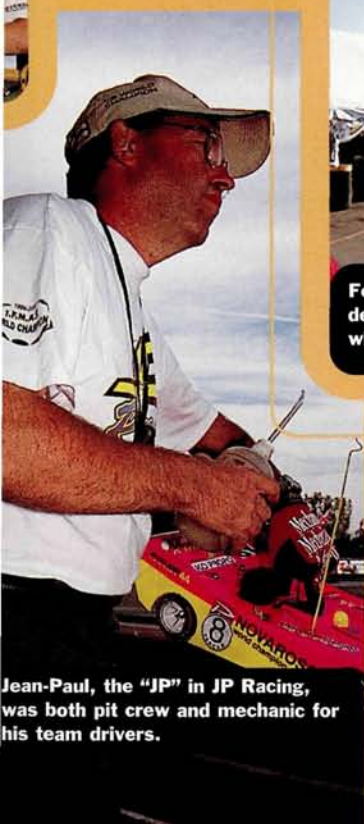
Alberto Picco of Picco Engines and Mario Rossi of Novarossi Engines have a friendly discussion during the finals.



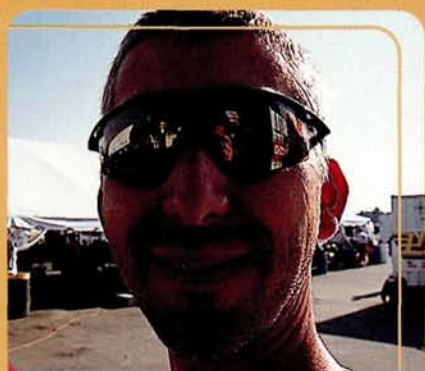
Peiter Bervoets of Serpent uses his spare time to videotape the event.



Kyosho President Aki Suzuki celebrates Kyosho's first World Championship in 1/8-scale on-road racing with a team member at the conclusion of the final.



Jean-Paul, the "JP" in JP Racing, was both pit crew and mechanic for his team drivers.



Former off-road world champion and designer extraordinaire Gil Losi Jr. wheeled a Mugen MRX-3 at the Worlds.



Second-place finisher Daniel Elasi and winner Lamberto Collari, both from Italy, celebrate victory with a little bubbly after the trophy presentations.



Rasheed Mykoo from Brooklyn Hobbies and Mugen driver Pooh White survey the track from the drivers' stand.

THE WRAP-UP

The level of talent that raced at this event was nothing short of incredible. Each of the fastest drivers is great in his own right, but it's awesome to see what they bring out in each other when they're on the same track competing for a prestigious title. Everyone brings his "A" game, and that kicks the level of competition up a few notches from an already high level. At the end of the show, however, there can only be one winner.

Lots of racers showed up in Hamilton, OH, with a legitimate shot at winning, but only when good fortune meets with awesome skills and painstaking preparation do you prevail. That's why they race for a full hour and not 5 minutes or even 30. A driver has to make it the distance to win, and running fast for 2 minutes counts for nothing in this setting. There are 149 stories that start with the two words, "If only ..." and just one that ends with "I won!" For the sixth time in the history of IFMAR competition, the latter story belongs to Lamberto Collari—the 1/8-scale On-Road World Champion for 2003.

RUNNING IN AN IFMAR EVENT

Participants at an IFMAR event are subject to slightly different operating procedures than those we're used to in the States. The manner in which the heats and Mains are arranged is a little confusing at first, but once you grasp the system, it makes perfect sense.

QUALIFYING: IFMAR starts; six rounds; two groups; 10-minute heats; fastest single round determines qualifying position; only four drivers are guaranteed a spot in the final.

Racers are slotted into their respective heats for qualifying. Heats 1 through 7 are the "A" group, and heats 8 through 15 are the "B" group. The "A" group runs two rounds back to back, then the "B" group does the same. It sounds confusing, but this sequence allows racers two rounds of qualifying without having to spend the whole day at the track. The heats are run using what's popularly known as "IFMAR starts." Cars are released at equal intervals to ensure that every driver has a clean track ahead for at least the early part of the heat before the faster racers catch up with the slower ones.

Each driver's qualifying effort is based on the fastest single run of all six rounds, so the qualifying order is a tossup until the last heat of the last round is concluded. There is no point system to attempt to level the field on a round-to-round basis. If the track conditions are poor during a driver's qualifying runs and his cumulative time is relatively slow despite his best performance, he's basically out of luck because other racers who are slower on average might have turned in better performances during another round when track conditions were better.

The system of filling the Mains (more on this later) means only four drivers are guaranteed a spot in the final. The four fastest qualifiers are slotted into first through fourth positions, and the remaining six cars are "bump-ups" from the lower Mains (more on this later).

FINALS: "Christmas Tree" staging for the finals; two groups of racers run the lower Mains rain or shine; 20-minute Mains up to the quarterfinal, a 30-minute semifinal and a 60-minute final.

The "Christmas Tree" system divides racers into parallel "A" and "B" groups, much like qualifying.

Determining the group in which a racer is placed is simply a matter of the qualifying position; racers who qualified with an even number, position 142 or 28, for example, go into various finals of the A group; odd-number qualifying positions go into the A B group. The A group alternates Mains with the B group, and that gives racers who bump up to a higher final the opportunity to prep their car for the next final.

Instead of identifying the Mains alphabetically, IFMAR uses a fractional system. The last race is the final, the semifinal is the $\frac{1}{2}$ final, next is the $\frac{1}{4}$ final, then the $\frac{1}{8}$ final, and so on down to the $\frac{1}{1024}$ final, if needed.

The racing starts with the lowest finals, each with a letter designation to identify which group will be running. For example, the finals would start with the $\frac{1}{1024}$ A final, then move to the $\frac{1}{1024}$ B final. The two fastest finishers from each final bump to the next, so the two fastest from the $\frac{1}{1024}$ A final bump to the $\frac{1}{512}$ A final. This happens all the way up the "tree" to the semifinals, where the three fastest of each group bump up to final, which fills out the field of 10 for the final. There are a couple of other details, but this gives you an idea of how the finals are run.

CLIMBING THE FINALS LADDER

| FINISH ↑ START | FINAL | |
|----------------------|---|--|
| | $\frac{1}{2}$ A final | $\frac{1}{2}$ B final |
| | $\frac{1}{4}$ A final | $\frac{1}{4}$ B final |
| | $\frac{1}{8}$ A final | $\frac{1}{8}$ B final |
| | $\frac{1}{16}$ A final | $\frac{1}{16}$ B final |
| | $\frac{1}{32}$ A final | $\frac{1}{32}$ B final |
| | $\frac{1}{64}$ A final | $\frac{1}{64}$ B final |
| | $\frac{1}{128}$ A final | $\frac{1}{128}$ B final |
| | $\frac{1}{256}$ A final | $\frac{1}{256}$ B final |
| | $\frac{1}{512}$ A final | $\frac{1}{512}$ B final |
| | $\frac{1}{1024}$ A final | $\frac{1}{1024}$ B final |
| | Drivers with even overall qual. ranking | Drivers with odd overall qual. ranking |



It's the responsibility of the host country to provide corner marshals for an IFMAR event. It is, after all, a world championship event, and the drivers are not expected to fulfill marshaling duties. So, the Tri-State RC Auto Racers club asked their members and local youths (one and the same, in some cases) to serve as corner marshals for the event. According to the event organizers, most available club members were already committed to other responsibilities, and the date of the race was such that many school-age kids were no longer available to help because school had already started.

Enter the criminal justice system. People who were required by the court to perform community service were able to "serve their time" as corner marshals for the IFMAR event. (This would be an awesome way to "do your time" if you're an RC enthusiast.) None of them were serious offenders, but unfortunately, none had RC racing experience.

There were some pretty funny stories of cars being left on their lids, placed facing the wrong direction on the track, placed on the wrong sides of barriers, etc. It takes a while to learn the subtle nuances of what it takes to be a good corner marshal, so it was a little ambitious to expect that the "volunteers" (hey, they could have picked another "community service") would be fully proficient at championship marshals in the blink of an eye.

At a meeting, the U.S. team drivers decided to fulfill the obligation of corner marshalling for the event. They realized it was a little too much to expect a community service crew to learn how to flawlessly execute marshalling duties so quickly. A few enthusiastic community service volunteers became die-hard fans, and they stayed for the duration of the event; the U.S. team drivers filled in for the rest.



NEW ENGINE TECHNOLOGY AT THE WORLDS SIRIO'S LATEST WEAPON

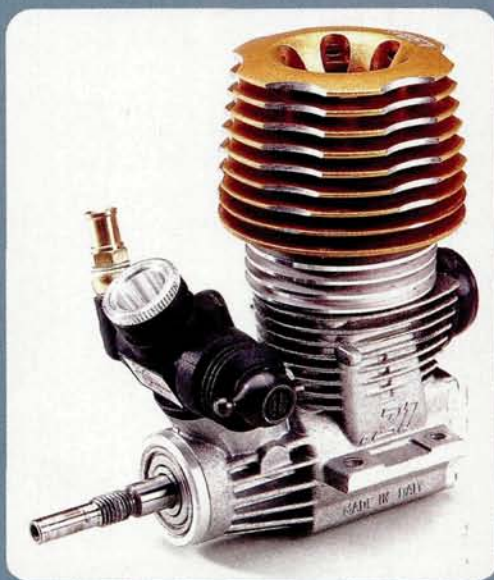
Sirio is still the only major manufacturer of RC car engines that produces engines with a chrome-plated aluminum piston sleeve. The aluminum sleeve is more than three times lighter than its brass counterpart, and its thermal efficiency is roughly 40 percent better than brass. Sirio's expertise in chrome plating the aluminum sleeve allowed it to develop a notable engine innovation that combines part of the block and the sleeve.

It's a little difficult to explain, but I'll try to hit on the key points without getting too technical. The engine block features transfer passages that have been cast into its interior, and these transfer passages guide the air/fuel mixture from the crankcase to the cylinder. The portion of the block that is above the ports has no function other than to support the upper end of the piston sleeve

and to help dissipate heat. Sirio combined this knowledge with its unique ability to manufacture an aluminum piston sleeve. The result is a unique sleeve design that has never been seen before on a modern ringless car engine. The aluminum sleeve and the heat-sink portion of the block are machined as one piece. The bore is then chrome-plated and precision honed. The sleeve is bolted to the block, and then the cylinder head is bolted to the sleeve.

THERMAL EFFICIENCY AND EXPANSION. In a conventional engine, the piston sleeve is held in place only by its upper flange. This compromises conductive heat loss because of a small gap around the sleeve that facilitates its installation and removal for maintenance. This clearance also allows the piston sleeve to expand more when the engine gets up to running temperature. The Sirio piston sleeve has a built-in heat sink that helps this engine dissipate heat faster than any conventional engine and prevents expansion because there's no gap with this new sleeve design.

REDUCED SLEEVE VIBRATION. The sleeve in a conventional engine is secured only by its upper flange. This allows it to move around a little because of the often intense vibration that results from high-speed operation. It's typical to see vibration marks where the sleeve contacts the engine block. The bolt-in design employed in the Sirio engine significantly reduces sleeve vibration, and the portion of the sleeve that slides into the block is much shorter. The sleeve from this Sirio engine was run extensively during competition at the IFMAR $\frac{1}{8}$ -scale race, but it hardly shows any of the typical signs of wear on the outside diameter of the sleeve.



SIRIO VS. RB CONCEPT

Competition between engine manufacturers is palpable at the world-championship level. They're all really friendly with one another, but the $\frac{1}{8}$ -Scale On-Road World Championship is as important to RC engine manufacturers as the Superbowl is to a football team. A lot of bragging rights, prestige and fame comes with a win at a world championship, so it's safe to say they make a strong effort.

It's a hilarious coincidence that an unnamed driver from the Star Motor Co. (Sirio) got a bad case of lead foot when he backed out of his parking space in the damp, muddy, grass parking lot adjacent to the track. The car got away from him a little, and before he could stop, he nuked the whole side of another car behind him. As luck would have it, the car belonged to none other than Frenchman Roddy Roem of RB Products, maker of RB Concept engines. When asked about the considerable damage to the side of his car, Roddy jokingly said, with a smile that could only come from someone who paid for the full-coverage rental insurance, "This is just more proof that Italians can't drive!"

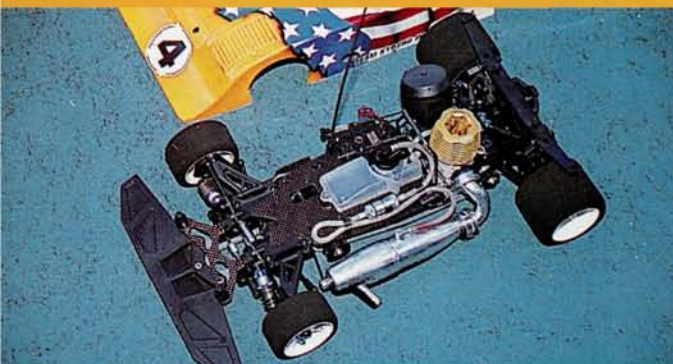


NEW IN THE PITS

MAX POWER ENGINES Massimo "Max" Fantini showed his new line of Max Power engines at the IFMAR On-Road Worlds. These Novarossi-based powerplants are made for all-out competition. They feature the latest technology that's also employed in the most current Exagon-series Novarossi engines. The Max Power engine shown here is designed for 1/8-scale on-road racing; engines for other applications may be available.



DELTA LOLA BODY The body that attracted the most attention at the race was the new Delta 1/8-scale on-road Lola. Drivers searched for traction all weekend; they had to race on a green track that had been rained on. Many drivers went with the Delta body because it reportedly provided more steering than the other available bodies.



KYOSHO EVOLVA 2003 This new car has yet to be released in production form, but it gave Kyosho its first win in the highly competitive class of 1/8-scale world championship racing. According to Kyosho president Aki Suzuki, the Evolva 2003 is an all-new car. It features a completely revised suspension geometry and chassis with a new laydown steering-servo mounting position. Exact details aren't available, but this was certainly the car to beat at the race; it took TQ, five of the 10 spots in the final and, ultimately, the win.

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SEGWAY HUMAN TRANSPORTER

These machines weren't part of the race, but they were attention getters in the pits. The new Segway Human Transporter (is that "Jetsons," or what?) is powered with a big brick of the same NiMH cells as we use in our electric cars and starter boxes. The Segway uses a series of gyros and redundant electronic systems to ensure proper balance over all types of terrain. The generous owner of these amazing machines let the racers try them out, and it was instant action. There isn't any acclimation period other than getting used to where a couple of controls are located: just lean forward and it moves, lean back, and it stops. There's a lot more to it, of course, but everyone who tried one couldn't help but think that these machines were incredibly cool.



NOVAMEGA KHM ENGINE

Serpent has a new modified version of the NovaMega Evo5 engine. Karl Heinz Meister, the German national champion of RC racing and Serpent's resident engine guru, is producing hand-modified engines under the NovaMega banner. The Novarossi-based Evo5 has individually selected components to ensure optimum fit, and the sleeve is hand-modified to increase performance throughout the rpm range. A hand-modified crankshaft features a transition area of the crank port that is filled with epoxy and smoothed for better flow. The main bearing at the rear of the crank is ceramic, which is lighter and supposedly longer lasting. For a distinguished look, the KHM Evo5 has a machined backplate.



SERPENT 950R

The new 950R 1/8-scale on-road sedan wasn't deployed on the track, but it was on display and was closely inspected by many curious onlookers. Serpent doesn't run cars that aren't available to its customers, so the team drivers ran their 950 cars with various modifications. The new R version has the following new features:

- Adjustable wheelbase
- Laydown throttle servo for a lower center of gravity
- Adjustable front belt tensioner
- Thick 5mm chassis plate
- Thick 2.5mm carbon-fiber radio plate
- A narrower front end for better steering response
- Relocated receiver mounting position
- Adjustable front roll-center geometry



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WHO STOLE SERPENT'S THUNDER?

Most of the top teams bring many spares of every part—and a lot of engines. The process of selecting the best engine for the Serpent team began weeks before the official start of the event. Serpent ran many engines back to back to establish which ones had that intangible feature that made them perform slightly better than the others.

At the IFMAR race in Ohio, at the conclusion of qualifying, the Serpent team left the top drivers' cars on the workbenches along with the two best engines for each in preparation for the finals. They were then locked up inside a trailer that the team used for pitting and storage.

On Friday morning, at the start of the lower finals, the Serpent team arrived to find both engines for Ralph Burch and Michael Salven missing from the trailer; nothing else was missing—only those engines. This meant that both the top factory Serpent drivers had no proven engines for the finals.

Serpent Team drivers in the lower finals were given fresh engines to run to help break them in during the short period of time remaining before they were needed for the finals. It was very nerve-racking for the teams' highest qualified drivers, but it worked out that each was able to find a good engine.

WINNING HARDWARE

KYOSHO EVOLVA 2003. This is Kyosho's newest 1/8-scale on-road car that's based on a completely new design. For more information, see the "New in the Pits" sidebar.

TRINITY PLATINUM FUEL. Three of the 10 drivers in the final, including winner Lamberto Collari, used Trinity's Platinum Blend fuel.

GRP/POWER TYRES. "Power Tyres" by Gandini Racing Products (GRP) were used by seven out of 10 drivers in the final, including the winner.

SANWA/AIRTRONICS SUPER EXZES RADIO. Although not commonly used in the States, this Sanwa/Airtronics stick radio is what Collari used in this race. The Super EXZES functions like the M8 radio, but it has stick controls for inputs.

SIRIO ENGINE. This new mill was the class of the field, trading TQ back and forth between Bertin and Cyrul during qualifying. When it took the win in this prestigious race, it cemented Sirio's place in history.



THE TRACK

The 1/8-scale On-Road World Championship only happens every two years, and this most recent event landed in Hamilton, OH, at the Hamilton Ohio Scale Auto Raceway facility at Joyce Park. Nestled into the corner of the recreational complex is a world-class track with dimensions of 280 feet (about 87 meters) by 135 feet (a little more than 41 meters). It's run by the Tri-State RC Auto Racers. Smooth, medium-bite asphalt is painted off the racing line, and concrete curbing on the inside of every corner prevents corner cutting but is conservative enough to avoid breaking a car if you clip the curb.

A well-elevated and covered 34-foot drivers' stand provides a bird's-eye view of the track for the drivers. An equally impressive timing and scoring stand features a lower level for the computer scoring and the race announcers, and there's an enclosed upper level for officials who monitor the races.

This is a very impressive facility; it's certainly one of the best in the country and is a credit not only to the club members who orchestrated its construction, but also to the city officials of Hamilton, OH, who were insightful enough to see it through. ■



THE WINNERS

| FIN. | QUAL. | DRIVER | CHASSIS | ENGINE | FUEL | PIPE | TIRES | BODY | RADIO | COUNTRY |
|------|-------|----------------------|----------------------|-----------|-------------|-----------|---------------------|---------|------------------|----------|
| 1 | 4 | Lamberto Collari | Kyosho F2003 | Sirio | Trinity | Sirio | Power/GRP | Kyosho | Sanwa/Airtronics | Italy |
| 2 | 2 | Daniele Ielasi | Mugen MRX-3 | Novarossi | ROGA | Novarossi | Fast/GRP | Mugen | Sanwa/Airtronics | Italy |
| 3 | 6 | Takaaki Shimo | Kyosho F2003 | Sirio | Trinity | Sirio | Power/GRP | Kyosho | Sanwa/Airtronics | Japan |
| 4 | 10 | Tsuguo Kitade | Kyosho F2003 | Novarossi | Cosmo | Novarossi | Zac Project | Kyosho | Sanwa/Airtronics | Japan |
| 5 | 9 | Oliver Mack | Serpent 950 | NovaMega | Runner Time | NovaMega | Ellegi Technics/GRP | Serpent | Sanwa/Airtronics | Germany |
| 6 | 3 | Adrien Bertin | Kyosho F2003 | Sirio | Trinity | Sirio | Power/GRP | Kyosho | Sanwa/Airtronics | France |
| 7 | 7 | Franck Bestel | Mugen MRX-3 | Novarossi | Runner Time | Novarossi | Enneti | Mugen | Sanwa/Airtronics | France |
| 8 | 1 | Josh Cyrul | Kyosho F2003 | Sirio | CEFX | Sirio | Power/GRP | Delta | KO Propo | USA |
| 9 | 5 | Ralph Burch | Serpent 950 | NovaMega | Fantom | NovaMega | Ellegi Technics/GRP | Delta | KO Propo | USA |
| 10 | 8 | Surikam Chaidasuriya | Mugen/Kawahara MRX-3 | Novarossi | Cosmo | Novarossi | Zac Project | Mugen | Futaba | Thailand |

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| | |
|------------------------|---------------------------------------|
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| WEIGHT (WITHOUT WIRES) | 0.76 oz. (21.5g) |
| PWM FREQUENCY | Reactive |
| INPUT VOLTAGE | 4.8 to 8.4 (4 to 7 cells) |
| MOTOR LIMIT | Over 5 turns |
| BEC | 5.8 volts |
| RATED CURRENT | 150 amps |
| PART NO. | 8083 |
| PRICE | \$160 |

OPERATION

Although it's a high-end racing ESC, the Quantum Competition 2 is very easy to use; it is set up and programmed in the same way as any other LRP unit. After I had soldered the leads to the battery and motor, it took only a few quick steps for me to be ready to race. All I had to do was to hold down and then release the setup switch to start programming; it's very easy to set up the QC2.

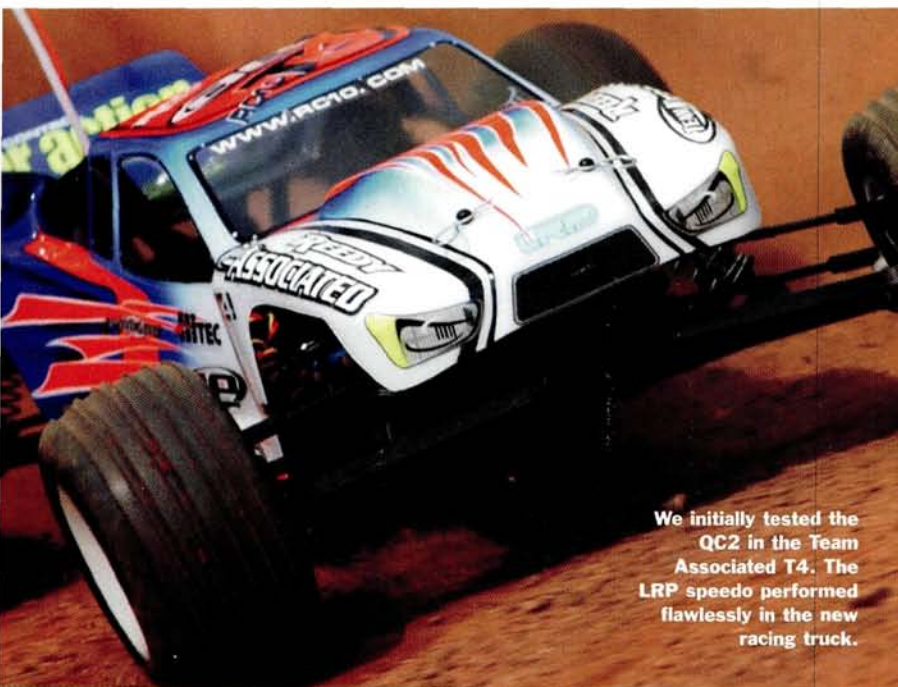


The Quantum Competition 2 can actually operate underwater—truly waterproof!

TESTING

I installed the Quantum Competition 2 in a new Team Associated T4 that was equipped with a Reedy Krypton 10-turn double motor and an X-Cell Gold Peak 3300HVR battery pack. After I had installed and programmed it, the QC2 worked as expected.

On the track, this ESC delivers instant acceleration and a smooth feel with absolutely no distinct "steps" as the truck transitions to its top speed. For even better snap off the line, I experimented with the automatic start mode. This feature allows hardcore



We initially tested the QC2 in the Team Associated T4. The LRP speedo performed flawlessly in the new racing truck.

FEATURES

Fully waterproof and shock-resistant. LRP has made the QC2 waterproof and virtually shockproof. As a result, the Quantum Competition 2 can be completely submerged while it's running without any chance of harming its components. Of course, the rest of the car won't be too happy about getting that wet, but it's good to know that a run under the hose when the track is watered during practice will pose no risk of frying your ESC.

Reactive software. Many racing speed control manufacturers can boast about their products' adjustable drive frequency settings, but the Quantum Competition 2 offers a whole lot more. When you want the most punch possible with a stock motor, you set the frequency to a low setting, and you make just the opposite setting for a hot mod to keep it drivable. LRP's Reactive software is totally different because to deliver the best possible performance, it actually changes the frequency, motor current and accelerator signal as you run. Coming out of a corner, the Reactive software will detect this, and it will then deliver maximum punch by using a low frequency and altering the other parameters. On a long straight, the Reactive software raises the frequency and changes the other parameters for higher top speeds and more efficiency. No more compromises.

Digital Engine Mapping System 2 (DEMS-2). The DEMS-2 has five available settings (called maps) for punch control. Punch is increased in each map, but this doesn't hinder top speed as it can do with lower-tech current limiters. The DEMS-2 feature works with the Reactive software. Selecting a specific map tells the QC2's Reactive software which frequency range to operate in.

Adjustable punch (DEMS-2), initial brake and automatic brake. The programmable modes of operation are punch control (DEMS-2), initial brake and automatic brake, and each mode has five settings. In the punch-control mode, the higher the setting, the harder the car will accelerate. As the initial brake setting is increased, you will notice a more progressive brake feel. The goal is an exponential-like feel with the more progressive settings. A lower setting yields a more linear feel with equal amounts of braking action for trigger movement. The automatic brake setting determines how much, if any, brake is delivered at neutral. A "zero" setting delivers no automatic brake, and a "5" setting will, conversely, yield what LRP refers to as a "strong braking effect" at neutral.

External solder points. The Quantum Competition 2 comes prewired and ready to install, but external solder points make it easy to replace wires when necessary. If you frequently swap your ESC between vehicles, this is an especially welcome feature.

Automatic start. This feature delivers instant power with virtually no delay at the tone; just activate it by holding full brake for 5 seconds before the start of the race. This mode disables any torque-limiting effect, so you'll have full power at the tone. When the trigger returns to neutral or brake is applied, any current-limiting software is re-engaged.

4-cell-ready. The Quantum Competition 2 is engineered for 4-cell operation without the need of a receiver pack. Since the QC2's tiny size makes it particularly attractive to 1/12-scale guys, the 4-cell compatibility is a major bonus.

Limited lifetime warranty. LRP offers lifetime replacement service and repair free of charge for the QC2 through Team Associated (in the USA). With this kind of "guarantee," you know your money is well spent and that this high-end ESC is a solid investment. LRP is confident that it offers a high-quality product, and it stands by it.

launches, so it will definitely provide an edge when starting on the front row.

All other aspects of the speed control worked flawlessly. The brakes never faded; they worked as strongly at the end of a run as they had at the start. Even without a heat sink, there was no evidence of a heat problem.

Since the Quantum Competition 2 is highly adjustable, I experimented with its settings. On the track, some adjustments were more noticeable than others. It's nice that I can tailor the ESC to suit specific track conditions and my driving style. For example, it can be difficult to differentiate between the different initial brake settings, but I found the automatic brake settings not only distinguishable but also great setup tools. On a tight track, I programmed in some automatic brake to make the hot, 10-turn mod motor as easy to drive in the corners as a stock motor would be. The automatic brake setting allowed me to compensate for the fact that the modified motor has no drag brake. On a wide-open track, I used the lowest setting to coast through the sweeping corners and still maintain high speeds.

Throughout testing, I experimented with each of the DEMS-2 maps (see more info about these settings in the "Features" sidebar). Although the differences between the maps are somewhat subtle, I found a noticeable difference between the smoother "1" setting and the "5" setting that delivers maximum punch. The Reactive software does its thing so fast that it was impossible to notice a difference in the delivery, and it was nice to know that I had an advantage on the track because I didn't have to select a specific frequency as a compromise setting.

LRP claims that the QC2 is waterproof, so this had to be tested. I connected it, fired it up and then dunked it right into the water. Not only did it survive this test, but it also outclassed other "waterproof" speed controls because it ran well when submerged.

Other ESCs I've tested just detect the short created by the presence of water, and then they shut down for protection. The QC2 is truly waterproof because it continued to operate.

WHAT'S HOT

- > No-compromise Reactive software.
- > Truly waterproof operation.
- > Simple setup.

WHAT'S NOT

- > Expensive (but well worth it).

THE VERDICT

The feature-packed Quantum Competition 2 is certainly a worthy heir to the Competition name. The waterproof feature adds to its reliability, and its plethora of features makes it a wise choice for racing. The tiny case also makes this a great ESC for racing because of the weight savings, and it's also a good choice for cars that don't have a whole lot of space for electronics. The Reactive software is a standout innovation that makes the Quantum Competition 2 a very high-performance and versatile ESC.

The Quantum Competition 2's small size makes it an easy install on any chassis.



NEWS FLASH!

Easton Wins 2003 IFMAR 2WD Off-Road Worlds with LRP

You can't find a much better performance proving ground than the IFMAR Worlds.




Billy Easton proved the QC2 has what it takes to win at the highest level when he took home the TQ and the win in the hotly contested 2WD class with his LRP-equipped Team Associated B4. Although the ESC is fully adjustable, Billy runs it with all the factory-default settings and says it's dialed right out of the box.



SOURCES

LRP distributed by Team Associated (714) 850-9342; teamassociated.com.



If you want to go fast with a mod motor, understanding timing is a must!

how to set mod motor timing

Advanced power!

by Lito Reyes

You've finally left the "comfort zone" of the stock-motor world and decided to step up to a modified motor. So, in addition to higher speeds and gearing variables, you also have the option of adjustable timing. You've may have heard that more timing equals higher motor rpm while less equals more torque. But what is the ideal amount of timing? Is the timing that was set on the motor at the factory really the best setting for your particular car or truck? What do you do if you "lose" your timing settings? Here's how to get in on some of that timing voodoo.

WHAT IS TIMING?

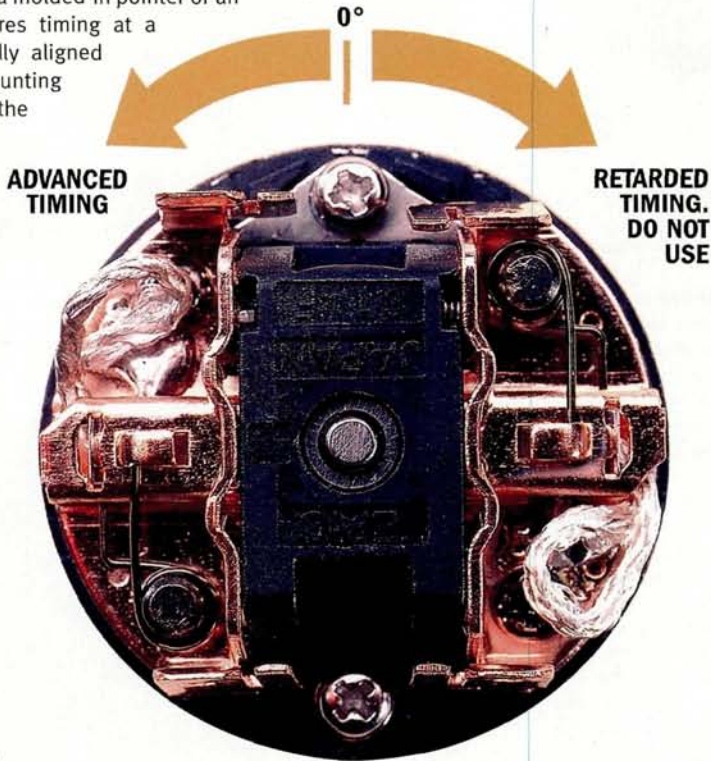
A motor's timing is the position of its brushes relative to its magnets. When the brushes are perfectly centered over the magnets, the motor has zero timing. When you rotate the endbell (and the brushes) in the direction that's opposite the motor's rotation, the timing is "advanced." Vice versa: when the endbell is rotated beyond the zero-degree mark in the opposite direction, the timing is "retarded."

Timing is measured by the degrees the brushes have been rotated away from the center position. Most motors come with a label that indicates the degrees and calibration marks to show where the timing is set. Even though timing refers to the position of the brushes in relation to the magnets, all motors have either a molded-in pointer or an endbell screw that measures timing at a "zero point." This is usually aligned exactly between the two mounting screws on the bottom of the motor can.

When a motor's timing is advanced too much, amp draw and motor rpm increase, but overall efficiency begins to suffer. When timing is retarded at all, the motor will run slower and hotter (which is why it's never really used!); zero timing is the lowest point at which motor timing should be set. A good rule of thumb is that motors with 15 or fewer turns are best set with 0 to 15 degrees of advanced timing, and winds of 15 and above work well with as high as 20 degrees of advanced timing. If you're unsure how much timing to run, err on the cautious side and run with less timing; your motor will run cooler, and your car will also run longer!

ADVANCING THE TIMING WILL INCREASE THE MOTOR'S RPM. ON THE OTHER HAND, IF ADDITIONAL PUNCH AND INCREASED RUN TIME ARE WHAT YOU'RE LOOKING FOR, DIALING THE TIMING BACK A FEW DEGREES MIGHT JUST BE THE TICKET.

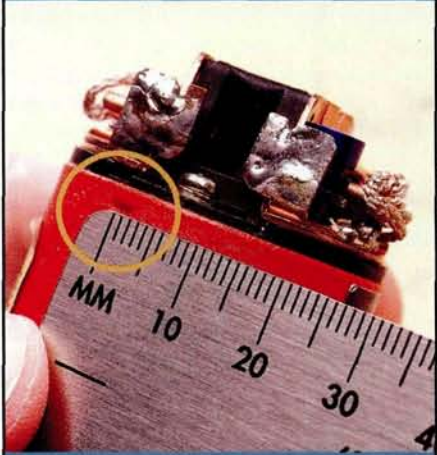
Turning the endbell opposite the rotation of the armature's shaft advances the motor's timing. An RC motor's armature turns clockwise (viewed from the endbell, as shown here), so the endbell must be turned counter-clockwise to advance timing.



more tips for mod-motor happiness

Most manufacturers set the timing on mod motors to approximately 20 degrees. This is a good starting point for your tuning.

- Don't advance your timing past 30 degrees. Advancing it too far can lead to a pitted comm and burnt brushes.
- Different manufacturers use different scales for timing marks on the motor labels. For example, Team Orion prints its labels at 6 degrees per timing mark, and Trinity uses a line at every 5 degrees.
- If your motor doesn't have a label or if the label has been damaged or removed, just remember that rotating the endbell by 3mm is equal to about 10 degrees. If you don't know how to find the zero-degree mark on your motor, be sure to read the "Finding zero degrees" sidebar in this article.



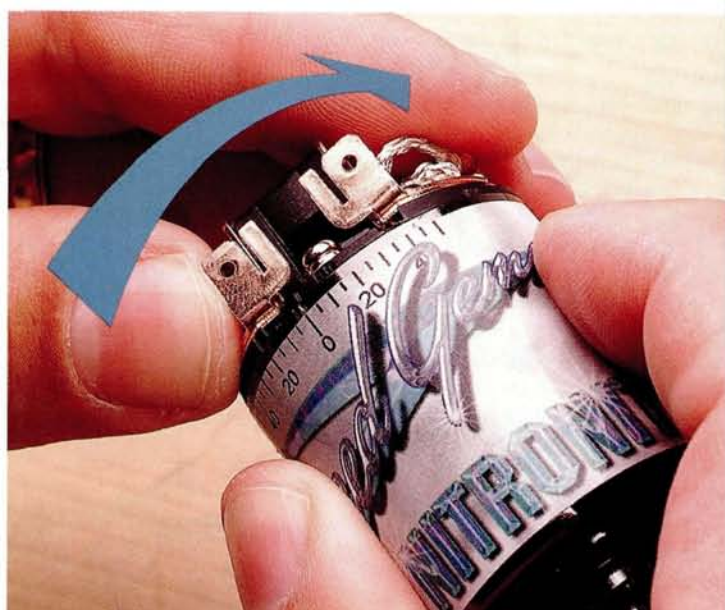
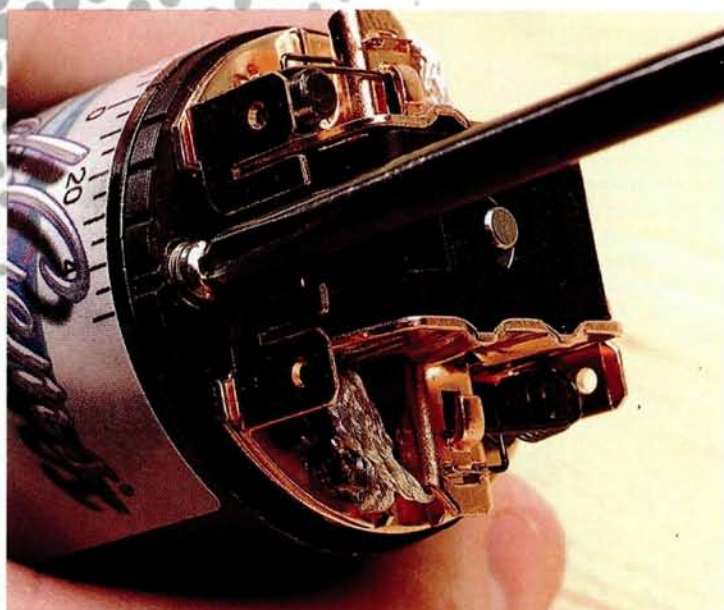
If your motor's label is missing, you can measure timing with a ruler; 3mm equals approximately 10 degrees. Note that the measurement is taken from the dimple on the can, which indicates zero degrees.

WHAT WILL CHANGING THE MOTOR'S TIMING DO?

- Advancing the timing will increase the motor's rpm. The downside when timing is too advanced, is that current draw is increased and torque is reduced. So, if you race on a wide-open track that keeps you on the throttle most of the time, advanced timing might make sense, especially if you use race-oriented cells that pack some punch.
- If additional punch and increased run time are what you're looking for, using less advanced timing might just be the ticket.

REMEMBER TWO THINGS: when you change a motor's timing, be sure to change it only a degree or two at a time; a too-radical timing change will ultimately take away from your motor's performance. Second, be prepared to change the gearing by a tooth or two as well. If you retard the timing, gear your pinion up a tooth; if you advance it, move down one tooth on the pinion.





HOW TO ADJUST TIMING

1. Note the current timing setting and mark it on the edge of the can with a Sharpie marker. If the new setting doesn't work for you, this mark will make it easy to reset it to the factory setting.

2. Loosen the motor's endbell screws with a small Phillips screwdriver. You don't need to remove them, just unscrew each one a couple of turns and then push down on the screw to release the timing ring from its position.

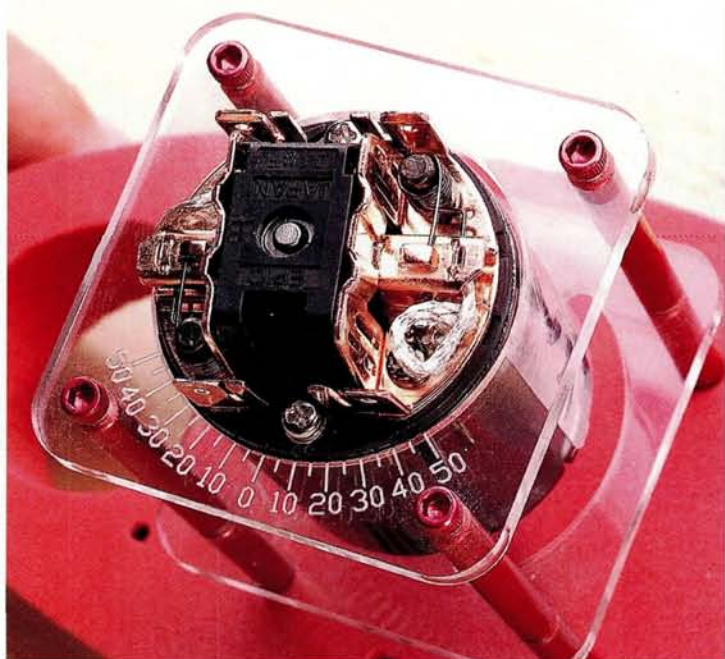
3. Hold the motor with the endbell facing you, and rotate the endbell counterclockwise to advance the timing, or turn it clockwise to retard the timing.

4. After you've set the new timing, tighten the endbell screws firmly.

Above left: you don't have to remove the endbell screws. Just loosen them a few turns, and then push them down to free the timing ring.

Above right: after you've loosened the endbell screws, rotate the endbell to adjust the timing. Always use a setting that is to the right of zero—never to the left.

Right: a motor-timing jig is a helpful tool for serious mod motor racers. Trinity's Matt Francis model is a great choice; just drop the motor in and read the timing off the gauge.



Finding zero degrees

Labels are damaged, or gremlins get to them. How do you know where to set the timing without the label? There is an easy way to determine the zero-degree point. Look at the bottom of the motor and find the two sets of mounting-screw holes. The zero-degree point runs between the two pairs of screw holes directly between the magnets. You can eyeball this pretty well on the endbell side of the motor can. Make a scratch on the can with a hobby knife to mark the location.

If you've lost your timing mark and need to find the zero-degree point, here's a quick way to identify the zero-degree dimple in the can. Look at the two mounting-screw holes on the bottom of the motor can. Zero degrees is right between the mounting holes, so the dimple above the holes is zero degrees.

Knowing how to adjust motor timing is a great thing to add to your bag of go-fast tricks. And since you don't have to spend money to get more speed or punch, it's our favorite kind of tuning trick—the free kind! As always, make small, incremental changes so you'll be able to see how they affect your car's handling and performance. Now get out there with your stopwatch and notepad; we'll see you at the track! ■

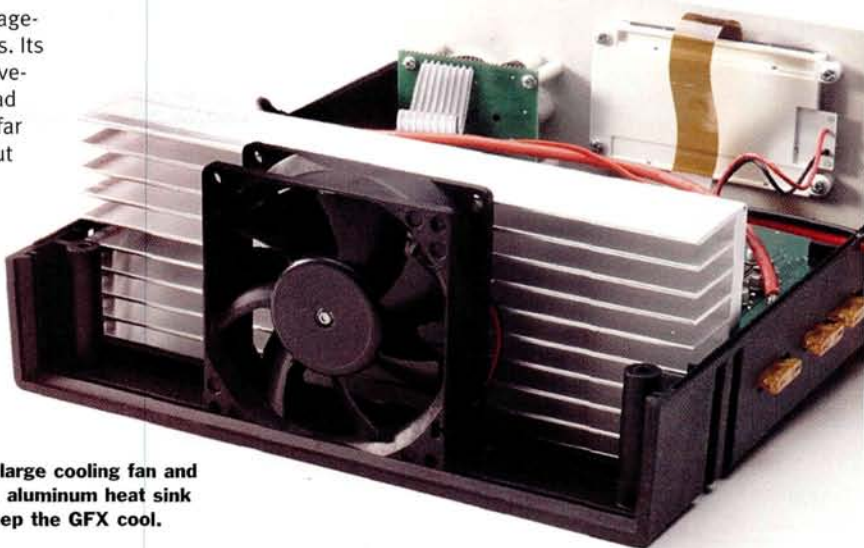
The GFX is microprocessor-powered, and it's also a battery-management system that includes cell-matching and conditioning functions. Its motor break-in feature puts out up to 20 amps so that you can conveniently break in a newly rebuilt motor and check any motor's no-load amp draw. You might be thinking that nothing you've read here so far distinguishes the GFX from certain other sophisticated chargers, but none have the combined quality, precision and intuitive programming menus developed by Competition Electronics during many years of racing and charging experience.

WHAT'S HOT

- > Intuitive, easy-to-navigate menu system.
- > Wide range of cell-management functions.
- > Higher amp limit for motor break-in.
- > It can charge, discharge and cycle a wider range of cells.

WHAT'S NOT

- > Fuses are used for reverse-voltage protection.
- > Alligator clips must be soldered to leads.



A large cooling fan and an aluminum heat sink keep the GFX cool.

FEATURES

Charges from 1 to 8 cells. This range of cells means you can charge just about any commonly used rechargeable pack. From a single-cell glow igniter to an 8-cell sub-C pack, the GFX can tackle it. It also charges the full range of Ni-Cd and NiMH cells that we typically use.

Charge rates up to 12 amps using peak-detection mode. Most racers charge at 6 amps or less for sub-C cells, but the GFX offers twice that charge rate—up to an incredible 12 amps! These higher rates are best reserved for cells that are of considerably higher capacity, though.

Nine levels of Turboflex charging. Turboflex charging is Competition Electronics' version of flex charging—a unique method that's intended to deliver a subtle shock to the battery to restore some of its original capacity, reduce internal resistance and reduce heat buildup during charging. It does so by breaking up the crystalline deposits in the cells as they age. This mode is intended for use only with Ni-Cd cells, however; flex charging is detrimental to today's NiMH cells.

Trickle mode. The GFX can be set to deliver a small top-up charge when peak charging is complete. In Ni-Cd batteries, trickle-charging helps to maintain a full state of charge. This mode can easily be disabled for charging NiMH batteries, which don't respond favorably.

Discharge rates of 0.5 amp to 35 amps. The larger discharge amp range is a key feature. The significantly lower limit allows the GFX to discharge and cycle smaller rechargeable cells such as 2/3A, AA and AAA cells (among others). This means that you can charge, condition and discharge cells for transmitters, receivers and power packs for minicars and microcars. This expanded range means you can extend the lives of the low-drain batteries we typically use to power our electronics.

Cycles up to nine times automatically. Batteries that have to be "conditioned" before they deliver peak performance—NiMH packs, for example—can benefit from being put through a series of charge cycles before they're used in competitions. The GFX can be set to run up to nine cycles consecutively. The delay between the charge and discharge cycles can be set at anywhere up to 180 minutes, so the pack has a chance cool properly before it's used again.

Reads cell voltages down to 1mV for readings of below 2 volts. This feature is helpful for serious racers who want to rematch their own cells.

Off-road and oval discharge profiles to condition packs. Ni-Cd packs suffer more from the "memory" effect than the newer NiMH packs, so this feature is intended to condition Ni-Cd packs for a certain type of discharging. Oval racing tends to involve a steadier, more consistent current drain, but the current drain during off-roading is less predictable and fluctuates more. These discharge

modes are designed to condition the packs for optimal performance in their respective environments, especially as the packs age.

Operates on 12 to 16 volts DC. The GFX requires a DC power source—either a strong battery or a power supply that can deliver voltage in the prescribed range—and up to 20 amps of juice. A lower amperage is enough to charge at lower rates, but using the motor break-in feature and the higher charging rate requires a commensurate power supply.

Separate voltage-sensing leads ensure precise voltage readings. Independent voltage leads mean more precise voltage readings and more accurate matching and actual resistance measurements.

Saves up to 10 charging profiles. If you had to set them each time for each type of battery, the many charging, discharging and cycling options would be enough to make your head spin. You can save 10 profiles for different types of battery or even for different applications for the same battery; six commonly required profiles have already been programmed in, but they can be modified to your liking. Simply set your parameters and save the profile so that when you next require a similar function, it's already programmed in.

Amp rate can be changed while you're charging. If you determine that you need a higher or lower amp rate for the rest of a charge cycle, simply rotate the dial on the charger's face. The charger will automatically go into a 60-second peak-lock-out mode to prevent the occurrence of a false peak because you altered the charge rate.

Computer interface. For really obsessive battery buffs, the GFX has a built-in serial port. Data can be downloaded and saved or printed for future reference.



A three-button panel and a rotary dial are used to navigate through the new GFX's features.

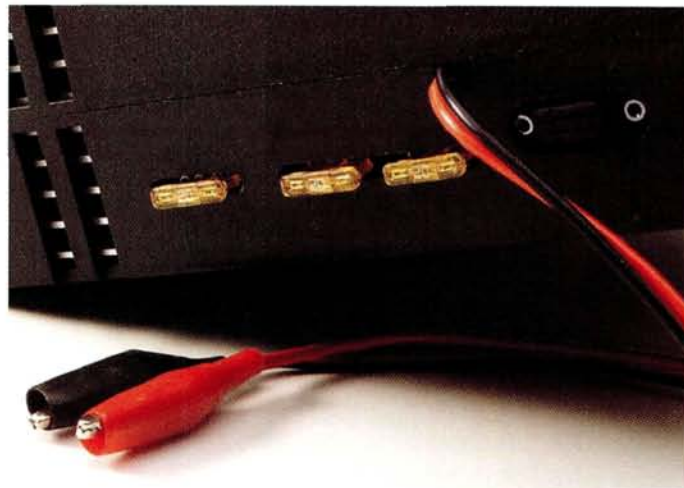
OPERATION

Using the GFX is easy thanks to its intuitive menu. It isn't completely idiot-proof, but navigating a battery-management system with as many features as the GFX has never been easier. It has a much larger backlit screen that shows more information when you're programming and charging. Up to eight lines of information can be displayed—six lines more than the previous display.

The menu-system groups charge, discharge, cycle, motor break-in, data and programming functions in separate menus. Additional screens are used to navigate the more complex functions, and they can be accessed by hitting the "Page" button when you're in a mode that has numerous settings.

Extra credit goes to the programmer who came up with the idea of adding the scrolling information line. Information pertaining to the highlighted feature scrolls along the bottom of the screen; for example, "Peak Det V" doesn't clearly spell out the function, but the information line at the bottom of the screen displays the following when this function is highlighted: "Peak Detect Voltage for charge peak #1. Range: .01V to .19V. Use rotary knob to change setting." Highlighting any other programmable function will cause additional information that pertains to that function to be displayed, so you don't have to take the instructions when you go to the track.

Charging a battery is pretty simple: just hook it up to the charger (avoid polarity errors, which will cost you a 20A fuse every time), select the correct charge profile and hit the start button. If a profile doesn't exist for your application, it will take you about a minute to punch in all the settings, which you can then save for future use. When you enter a new profile for a specific application or battery type, it's best to enter all charge, discharge and cycling data so that it will be saved for future use.



A serial port allows the GFX to be connected to a PC so that you can download data by means of the Hyperterminal. The fuses protect the charger from being damaged by reverse voltage.

TESTING

The GFX's expanded capabilities mean it can charge a greater variety of cells and packs. It charges conventional sub-C Ni-Cd and NiMH cells and smaller $\frac{2}{3}$ A, AA, AAA and other, lower-capacity cells. The GFX's greater range means that it can charge, discharge and cycle receiver, transmitter and starter-box packs in addition to its primary function: precision-charging matched packs.

Competition Electronics (CE) suggests that you experiment with low peak-voltage levels until your pack reaches a temperature of 120 to 130 degrees F. According to CE, when this temperature is reached, it indicates a chemical reaction has taken place inside the pack and that it's fully charged. Different types of cell require different peak tolerances for optimum charging; the same goes for different brands of the same type of battery. It's best to experiment with increasing levels of peak detection only until the battery is slightly warm to the touch.

It takes a few dry runs to get used to some of the navigation and setting options; if you already own a CE charger, you'll have more insight into

the navigation logic of this one than if you're completely green.

I charged, discharged and cycled a wide variety of packs completely uneventfully, so the GFX does its job. I cycled single cells, small receiver packs, AA NiMH transmitter cells, $\frac{2}{3}$ A 2- to 3A 5-cell receiver packs, similar packs for microcars and, of course, sub-C Ni-Cd and NiMH packs. I consistently achieved a full charge without false peaking.

Depending on the type of battery, the peak levels needed tweaking, but there weren't any surprises. Navigating through the functions, I was initially a little clumsy, but it doesn't take long to get used to the menu system.

The only aspect of the charger's operation that was a problem for me was adjusting the time delays. The delay from peak to re-peak, charge delay and cool-down delay between cycles ranges from seconds to 999 minutes. Using the not-so-easy-to-grip dial, you need to turn it fully more than 41 times to hit 999 minutes, and another 41 times to return to zero. Apart from that, the charger is easy to use, and the scrolling info at the bottom of the screen contributes to this.

Comparison with previous Turbo charger

| Charger | Turbo 35 Stealth | Turbo 35 GFX |
|---------------------------------|--|---|
| Max. no. of cells | 1, 4, 6, or 7 | 1 to 8 |
| Setting profiles | 3 | 10 |
| Charge limit | 3800mAh | No limit |
| Unique profile names | Not available | Yes, up to 9 characters |
| Charge amps | 1 to 12 | 0.1 to 12 |
| Discharge amps | 10 to 35 up to 6 cells; up to 25 for 7 cells | 0.5 to 35 up to 6 cells; up to 25 for 7 cells; 20 for 8 cells |
| Internal-resistance measurement | Internal resistance | Actual or relative internal resistance |
| Beeper function | Programmable | Programmable |
| Delay-charge start | Not available | Up to 999 minutes |
| Peak-detect voltage | 0.01 to 0.19 | 0.01 to 0.19 |
| Motor break-in voltage | 0.5 to 8 | 0.5 to 8 |
| Amp limit for motor break-in | 12 | 20 |
| TurboFlex levels (intensity) | 1 to 9 | 1 to 9 |
| Display | Backlit 2-line screen | Backlit 8-line screen |

THE VERDICT

The GFX, much like its predecessors, commands a hefty price (around \$450). But discriminating racers have repeatedly proven that they aren't averse to paying for well-proven high-tech hardware as long as it delivers. The GFX is the latest in a long line of chargers that does just that. Is it perfect? No. The included alligator clips have to be soldered to the charger leads before you can use the GFX. The GFX also uses fuses to protect itself against reverse voltage from the power source and the battery being charged. Slip up when connecting any charger lead, and you'll

be down a 20A fuse. CE may have technical reasons to choose fuse protection in preference to more modern electronic countermeasures, but if there isn't any advantage to one method or the other, I'd prefer the latter. In the grand scheme of things, these are minor detractors from an otherwise excellent piece of equipment for serious racers.

SOURCES
COMPETITION ELECTRONICS (815) 874-8001; competitionelectronics.com.

from *Model Airplane News* to monster



1929: Model Airplane News

It all started here! The world was obsessed with flight as airplanes flew faster and farther than ever, and *Model Airplane News* captured the imagination of modelers with a huge variety of rubber-band-powered planes and gliders—not to mention “flying adventure” fiction and coverage of full-scale aviation.

It's 2004! Along with celebrating another year of living on this planet (even though it was supposed to explode at the end of the last millennium), we're celebrating 75 years of producing the finest radio-control model publications in the world. *RC Car Action* has “only” been around since 1986, but our sister magazine *Model Airplane News* first hit the streets in 1929. Along with the burgeoning model-flight hobby, the magazine was the source for info on powered model cars. Ready for a look back? Here are the issues, articles, ads and products that have shaped the last 75 years of RC modeling.



Before there was radio control, tether cars were the only way to go for powered model-car action. Although simple, these direct-drive cars were incredibly fast as they sped around a perfect circle, safely tethered (hence the name) with a steel cable. Spark ignition systems fired their free-breathing 2-stroke engines that ran wide-open until the car ran out of fuel.

1930s



1938

“How to Control Your Plane by Radio” by Clinton B. Desoto appears in the December 1938 issue of *Model Airplane News*. The system is as crude as it gets, with only one channel and no proportional control, but RC is on its way!

TRUCKS

75 years

of RC publishing

by the RC Car Action team

1940s



- ★ **SMALL ENOUGH** for Class B
- ★ **Can be installed in** control line models

The last word in scientific plane control by radio! Equipment furnished includes transmitter in black crinkled finished metal case size 4" x 4" x 6", range approximately 2 miles; receiver size 4 x 1 1/2 x 2 1/2" high, weight 5 ounces, operates on 4 Pen-Light batteries (2 ounces); 1-45V. "B" Battery (8 1/2 ounces); and escapement unit size 2 1/2 x 1 1/2 x 1" high, weight 1 ounce (not shown). Also useful in model railroading for radio train control.

Retailing at **\$59.50** at your dealers

The R.L. Webber Championship hand-held transmitter appears in advertisements in the 1946 issues. This is the first advertised, commercially available system.

By 1949, reed-selector radio technology is finding its way into airplanes thanks to articles like "Audio Tone RC" in the August issue of that year. The reed systems are the precursors of modern, fully proportional systems.



Free-running and tethered cars were still the way to fly in the '40s.

In the August 1947 issue, a how-to called "Cockpit Radio Control" explains how to construct a predecessor of modern servos. RC as we know it is getting closer!

In 1949, McCoy was a big name in "glow" engines. Glow power was a recent innovation; spark ignition was the standard of the era.



The Citizen-Ship RC system is advertised in 1950. It's the first FCC-approved system available, and it eliminated the need for RC modelers to earn an FCC license.

1950s

Postwar prosperity brought new technology to radio control, and commercially available RC gear that does not require an FCC license is offered for the first time. But with the exception of one-off projects, RC cars aren't here yet; tether car and free-running models are still the only way to run on wheels.



No RC in cars yet, but rocket engines? Sure! These free-running speed demons ran on solid-fuel pellets. No brakes, no "off" switch!

1960s



Racing gets serious. In 1968, George Siposs forms the Radio Operated Automobile Racing sanctioning body—better known as ROAR. Here's George in 1975, with his "Spirit of California" speed-run car, which topped out near 40mph. Just about any nitro-powered RTR available today could outrun it!

In the late '60s, nitro-powered, 1/8-scale, on-road cars emerge as the dominant RC class as Associated, Heathkit, Dynamic and other brands produce crude kits—they're little more than suspension-less slabs of aluminum. Electric RC toy cars also begin to appear, but they're just that—toys.

FIRST!

- First with... For ultimate scaled body — for ultimate performance, contact design and protection.
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- First R/C car with 100% steering servo protection. (Patent pending)

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POWER PACKS; CONVERTERS; SERVOS; CONNECTORS; WHEELS; BRAKES—DESIGNED especially for R/C!

SPACE CONTROL CORP.
GARDENA, CALIFORNIA

1961
Proportional RC control arrives in the form of the Space Control system. The gear cost \$500, which is a ton of dough today—imagine forking it over in 1961!



The XR311 Combat Vehicle was another late-'70s Tamiya kit, and it saw a limited re-release in 2001. Tamiyas are the most-collected vintage RC cars.

1970s

By 1975, electric RC moved away from toy fare into real hobby stuff—still crude by today's standards—but much better than the toys of the time and not too far removed from modern pan cars. Associated, JoMac, Leisure, MRP and Bolink all offered direct-drive kits in 1/12 scale.

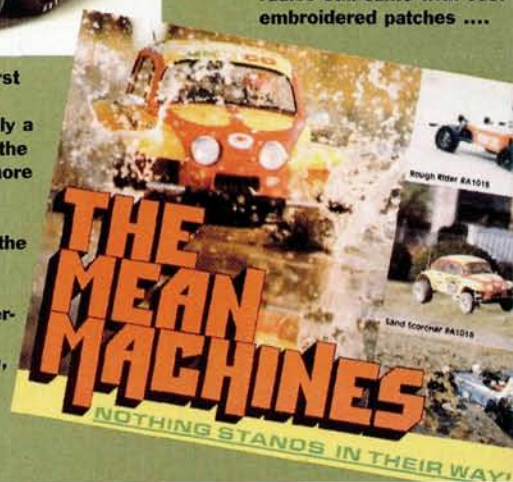


up
Futaba

Futaba had the first high-quality wheel radio in 1977, and the brown box soon took over. If only radios still came with cool embroidered patches

In 1977, Tamiya advertised its first RC car kit, a hard-bodied Martini Porsche. The simple kit is basically a static model made driveable, but the easy-to-assemble kit makes RC more accessible than ever.

Two years later, Tamiya released the Sand Scorchers and Rough Riders. The kits bring realistic functional suspension to RC along with water- and dirt-proofing features that make real off-road action possible, setting the stage for the massive RC car boom in the 1980s.



The "Radio Control Speed and Sport" section of *Model Airplane News* was devoted to RC cars ... and the occasional motorcycle.

With *RC Car Action* still years away, *Model Airplane News* is the source for RC car news and reviews. This spread on the Associated RC250 ran in a 1971 issue.



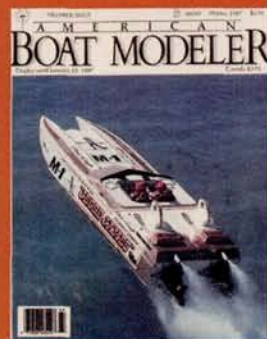
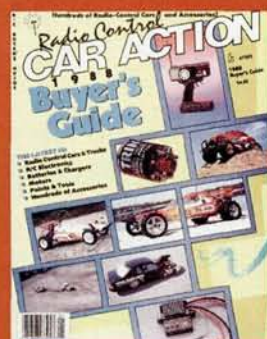
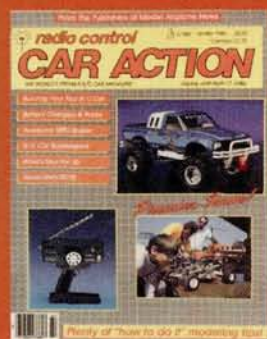
1980s

The RC car scene explodes, fueled primarily by Japanese off-road kits. Tamiya leads the charge with kits such as the Hornet, Grasshopper and Wild Willy, while Kyosho has hits with buggies like the Rocky and Raider. Tamiya and Kyosho are the biggies, but the '80s saw brands aplenty: Hirobo, Cox, MRP, ATK, Mugen, Marui

And now The HORNET



Our first Clod Buster review appeared in 1988, and we've covered it in some way every year since then! Tamiya's monster truck megahit is still popular today as the standard "blank canvas" for solid-axle, electric monster truck projects.



1986
Radio Control Car Action hits the newsstands. Initially launched as a quarterly, the magazine is a huge hit and quickly goes monthly, then soon becomes the world's number-one RC car mag. It still is!

The annual **RC Car Action Buyer's Guide** debuted in 1988 with 140 pages of kits, tools, parts and gear. It gets thicker every year and is rapidly approaching phone-book status—the 2003 edition contained over 1200 products in its 250 pages!

American Boat Modeler (now **RC Boat Modeler**) was brand-new in 1987 and quickly became the most popular RC boating magazine on the planet.

1984
Associated RC10. Much like today's Traxxas T-Maxx, the original gold-tub RC10 was so deeply supported with aftermarket parts that you could almost build an "RC10" with very few actual Associated parts left on the chassis! From its large-volume oil shocks and A-arm/camber-link suspension to its 6-gear tranny and ball differential, the RC10 was the ultimate off-road racing machine.



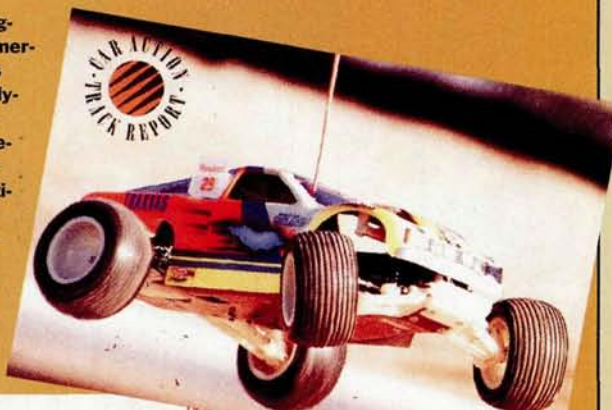
Associated's RC10 got some stiff competition in 1989, when Team Losi went from being an accessory maker to a car manufacturer and burst onto the scene with the JR-X2. Although it matched the RC10's performance, it was no clone. Five-link rear suspension, bottom-filled shocks, externally adjustable diff, graphite plate chassis—the JR-X2 was full of new ideas.



1990s

RC showed no signs of slowing down in the 1990s, as nitro off-road racing boomed thanks to vehicles like the Traxxas Nitro Hawk and Associated RC10GT, and parking-lot racing with F1 cars was the thing to do—until Tamiya's "TA" series of Manta Ray-based cars came along and launched the touring car revolution.

Traxxas tried its hand at big-time racing and offered numerous kits, but the company's true vision for RC was ready-to-run (RTR) vehicles. With the Nitro Hawk, Traxxas elevated "RTR" to a new level of performance and sophistication, and countless electric guys went nitro for the first time with Traxxas' first-ever, engine-powered, factory-built truck.



THRILL

OR BE THRILLED?



FACT: 19 out of 20 cars in circulation were Team Losi trucks.

FACT: 1st, 2nd, 3rd and T.O. modifiers were all powered by Revolution Motors.

FACT: The JR-XT has won EVERY N.O.R.C.C.A. and R.O.A.R. Monster Truck National Championship.

Another first for Team Losi, as the JR-XT debuts in 1990 as the first "racing monster truck." Before the JR-XT came along, Tamiya's Blackfoot and King Cab and converted buggies were considered racing hardware. When the JR-XT took over with its truck-specific, performance-first design, big-tire racing got serious.

The era of Ni-Cds begins its decline in 1999, as the first nickel-metal hydride cells hit RC. Panasonic was the first out of the gate with a 3000mAh NiMH sub-C cell that paved the way for today's ultra-low-turn mod motors.

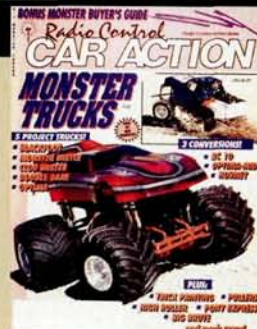


TEAM LOSI XX-4

FULL-THROTTLE racing monster truck was the first RC off-road design to feature a full-throttle, 4WD design. The first of its kind, the XX-4 was designed to be a true racing monster truck. The first of its kind, the XX-4 was designed to be a true racing monster truck. The first of its kind, the XX-4 was designed to be a true racing monster truck.

Re-inventing Four-Wheel Drive

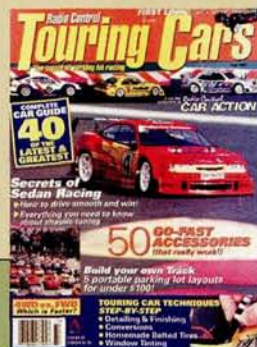
Team Losi gave electric buggy tech a giant shove forward in 1994 with the Double-X. We take features like modular assembly, raised chassis sides, molded shock towers and "lay-down" trannies for granted now, but the Double-X had 'em first.



Our first-ever *Monster Trucks* special issue appeared in 1990 and featured "project" versions of Tamiya's Blackfoot, Monster Beetle, and Clod Buster and Kyosho's Double Dare and Optima.



Radio Control Racer was a new special issue for 1991 and featured a shootout between the Team Losi JRX-Pro and Associated RC10 Team Car. More than 10 years later, Losi and Associated are still battling for RC dominance in the dirt—as well as on the blacktop.



Sedans were the hottest segment in RC in 1997, so a new special issue was launched: *Radio Control Touring Cars*. We've published it every year since, and the touring car scene shows no signs of slowing down!



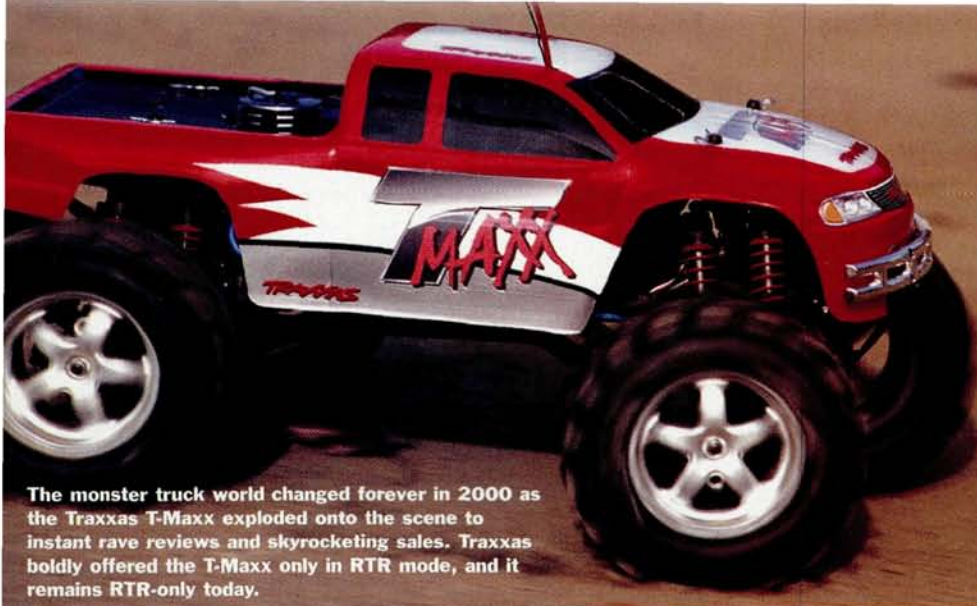
even I could win with this car!"

XX-4

| SPECIFICATIONS | |
|----------------|-----------------|
| Model | XX-4 |
| Length | 10 1/2" |
| Width | 5 1/2" |
| Height | 4 1/2" |
| Weight | 1 1/2 lbs. |
| Motor | 1/8" 28,000 RPM |
| Transmission | 1/8" 28,000 RPM |
| Driveshaft | 1/8" 28,000 RPM |
| Wheels | 1/8" 28,000 RPM |
| Tires | 1/8" 28,000 RPM |
| Chassis | 1/8" 28,000 RPM |
| Shock Towers | 1/8" 28,000 RPM |
| Trannies | 1/8" 28,000 RPM |
| Assembly | 1/8" 28,000 RPM |
| Price | 1/8" 28,000 RPM |

The first nitro boom was already underway in the early '90s, but it really took off for racers when the Associated RC10GT hit the scene. The truck instantly made the cobbly conversion kits of the day obsolete and became a huge hit with racers and sport drivers alike. It's still Associated's best-selling machine.





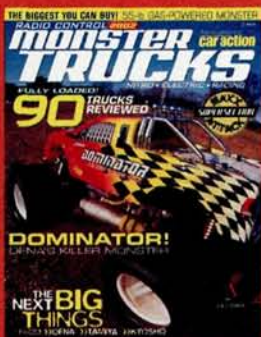
The monster truck world changed forever in 2000 as the Traxxas T-Maxx exploded onto the scene to instant rave reviews and skyrocketing sales. Traxxas boldly offered the T-Maxx only in RTR mode, and it remains RTR-only today.

So far, the 21st century is all about ready-to-runs and monster trucks—especially ready-to-run monster trucks! The success of the Traxxas T-Maxx makes the “big nitro truck” scene the most vibrant, but RC is thriving across the board; on-road and off, nitro and electric, radio control is bigger and better than ever.

2000+



Radio Control Nitro, the only all-nitro RC car magazine debuts and promptly becomes a sellout success. It's still the number-two RC publication, second only to RC Car Action.



Monster Trucks returned in 2002, thanks to the huge influx of new monster-machines built to take on Traxxas—the issue even featured a special “Maxx Attack” section devoted entirely to Traxxas trucks. The 2003 edition of *Monster Trucks* is doing great, and it'll be even bigger and better in 2004!



In 2002, *Backyard Flyer* became the first magazine devoted entirely to small electric planes that can be flown in a backyard or athletic field. The new breed of easy-to-fly, small-space-friendly air-planes is making RC flight more accessible (and popular) than ever.



RCX: *Getting Started In Radio Control* is just hitting newsstands now, and it has one mission: to grow RC! The mag focuses on ready-to-run cars, planes, and boats, with an emphasis on first-time success (and long-term participation) in RC. More people with transmitters in their hands equals more fun for everyone.



Between issues of *RC Car Action*, rcrcaraction.com is the place to be. Along with “Pit Tips,” “Readers’ Rides,” “Hot News” and articles online, you can check out the RC Zone, home to the number-one, most-visited bulletin board for RC car fans.



RCX, the industry's first-ever RC-only trade and consumer show is launched by Air Age Media, publisher of *RC Car Action*. The southern California event introduces thousands to RC for the first time, and is a huge hit—make sure you make it to the 2004 RCX show!

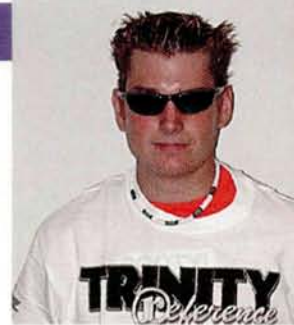


Who knows what's in store for the next 75 years?

No one can say where technology will take us next, but one thing is certain: whether it flies, floats, or drives, you'll see it in the pages of *RC Car Action*, *RC Nitro*, *RC Boat Modeler*, *Backyard Flyer* and *Model Airplane News*!

Batteries Got You Baffled?

Who better to get you off on the right track than Team Trinity's Paul Lemieux. Paul has honed his racing knowledge under his mentor Jim Dieter, Team Trinity's World Champion race winning engineer, designer and team manager. Paul does a great deal of the on-track testing on new Trinity releases so he has plenty of knowledge on batteries, charging and battery care. In fact Paul admits to having toasted a few packs like the one below in his early days so he knows what he is talking about in his simple tips for charging and discharging.



Paul Lemieux Charges Them Up

| Part Number* | Name | mAh | Voltage | Cells | Technology | Zapped | Matched | Assembled | Paul's Suggest Use |
|--------------|-------------------------|-------|---------|-------|------------|--------|---------|-----------|--|
| RC5922 | Trinity Zip Pak 2 | 1500 | 7.2 | 6 | Ni-Cd | No | No | Yes | Good second pack for your first car |
| RC5920 | Trinity Sanyo Amp Max2 | 1500 | 7.2 | 6 | Ni-Cd | No | No | Yes | Sanyo cells means this pack is super tuff! |
| EP0006 | EPIC 1500 | 1500+ | 7.2 | 6 | Ni-Cd | No | No | Yes | Longest running of all the 1500 packs! |
| RC2271 | Trinity GP Speed Spec | 1600 | 7.2 | 6 | Ni-Cd | No | No | Yes | The only legal Spec racing battery pack. |
| RC2270 | Trinity GP Speed Spec | 1600 | 4.8 | 4 | Ni-Cd | No | No | Yes | |
| RC1778 | Trinity Volt Maxx Sanyo | 1700 | 7.2 | 6 | Ni-Cd | No | No | Yes | Great for Speed Gerns Pro 15 turns & up. |
| RC5897 | Trinity Time Warp | 1900 | 7.2 | 6 | Ni-Cd | No | No | Yes | Same as above only better than what I raced with before I joined Trinity. |
| RC5896 | Trinity Maxx Paxx | 1900 | 7.2 | 6 | Ni-Cd | No | No | Yes | 2 packs with a special price for E-Maxx's |
| RC2417 | Trinity Sanyo 2400 | 2400 | 7.2 | 6 | Ni-Cd | No | No | Yes | Good pack for stock motors & mild modified motors 13 turns & up. |
| RC5900 | Trinity Zip Metal | 2500 | 7.2 | 6 | Ni-MH | No | No | Yes | First of the serious batteries made for modified motors 13 turns and up. |
| EP0007 | EPIC 3000 | 3000 | 7.2 | 6 | Ni-MH | No | No | Yes | Best back yard basher when it comes to cost vs. performance/run time! |
| SNT3307 | Trinity Sanyo 3300 | 3300 | 7.2 | 6 | Ni-MH | Yes | No | Yes | Sanyo's are good for hot modifieds like 12 turns and below. |
| GN3307 | Trinity GP3300 | 3300+ | 7.2+ | 6 | Ni-MH | Yes | No | Yes | Great pack, good power but a bit less run time than EPIC 3300 packs below. |
| EP0019 | EPIC Monster Metal | 3300+ | 7.2+ | 6 | Ni-MH | Yes | No | Yes | Hi-voltage output, great for stock racing where matching is not as important as volts! |
| EP0018 | EPIC Monster Matched | 3300+ | 7.2+ | 6 | Ni-MH | Yes | Yes | Yes | Same cells used by the pros, the most power for stock & modified motors. |

Ni-Cd vs Ni-MH, Which Should I Choose?

With today's advances in Nickel Metal Hydride technology, any issues with reliability and battery pack longevity are a thing of the past. Ni-MH has passed Nickel Cadmium in all areas of performance especially in capacity, (run time). 3000 mAh capacity is now a standard and the best cells running to 3300 mAh. That is almost double the run time of the best Ni-CD battery pack from just a few years ago.

Most chargers made in the past 2 years offer settings specifically for Ni-MH so charging would not be an issue. You need to use a charger made for Ni-MH as the cell does not like to be overcharged at peak like a Ni-CD does. Only the older chargers will not have this capacity. Check with your charger's specs before buying your first Ni-MH battery.

So if you are looking for run time go Ni-MH!

For More Information Visit

TRINITY

www.teamtrinity.com

EPIC
MOTORSPORTS

www.epicmotorsports.com



Over-charge your pack just once and it's toast. Everyone usually does this at least once when they start racing. This is why you need a good charger.

There is no way to fix this baby. The charger either did not turn off, the pack was hooked up backwards, something shorted across the plug or the pack was fully charged and put back on a timer charger for another 20 minutes. If it was shorted out internally the shunt at the back would have been melted through and the leads would have melted off.

99% of all meltdowns are charging errors or packs shorted across the plug.

1. Buy the best peak detection charger you can afford. It's way cheaper in the long run than replacing blown-up battery packs.
2. Read the charger and battery instructions BEFORE charging!
3. Never recharge your pack while it's hot. Let it cool completely. This is why you always need a second pack.
4. Make sure your pack is fully discharged before charging it again, especially with a manual cut-off charger.
5. Hook it up correctly, + to +, - to -...duh!
6. If your charger has adjustable Delta peak set it to .04 milli-volts. This will work with both Ni-Cd & Ni-MH packs. Or follow your charger manufacturer's suggestions.
7. Charge at 4 amps. Re-peak pack right before racing it at 4 amps. Pack should be warm, not hot!
8. Don't trickle charge, that makes your pack run a long time but with no top speed.
9. When discharging your Ni-Cd and Ni-MH packs on a fast discharger, to be safe do not go below 5.40 volts for the pack.
10. Store Ni-MH packs at least 50% charged.
11. Store Ni-Cd packs completely discharged with a 30 ohm resistor across plus and minus.





Two Engines, One Savage!

Dual-engine *anything* is cool, but if there's one type of RC machine that deserves a double scoop of horsepower, it's the monster truck. And one monster truck is particularly ripe for the treatment: the HPI Savage. This big rig's super-plush suspension soaks up the extra weight of dual engines and the extra-hard hits it will have to take at double-horsepower speeds, and dropping in a pair of powerplants is easy now that New Era has a complete dual-engine conversion kit custom-fit for the Savage series. I installed the gear along with a pair of O.S. engines and a bunch of other trick parts to build my vision of the world's scariest Savage.

parts list

CHASSIS

GOLDEN HORIZONS

Aluminum bulkhead—02070; \$44

HARDCORE RACING COMPONENTS

Roll-bar handle—HCR-01764; \$68

NEW ERA

Dual-engine conversion kit—HSV121; \$280

Super-duty bulkhead brace—HSV340SD; \$13

DRIVE TRAIN

GPM

Alloy gearbox F/R—SAV1011; \$38 each

Titanium center universal shaft—TSAV1037; \$38

Titanium dogbones & axle set—TSAV12100; \$48

Delrin main gear—DSAV1050T; \$12

Turbo disc brake—SSAV1039; \$13

Titanium Delrin 2-speed gear set—TSAV1000T; \$88

HPI

Aluminum hex wheel hub—86142; \$25

SUSPENSION AND STEERING

GOLDEN HORIZONS

Adjustable shock tower—02068; \$30

Lower arms—02052; \$38

Adjustable upper links—02053; \$28

Steering bulkhead support—02058; \$27

Steering knuckles—02056; \$30

HARDCORE RACING COMPONENTS

Titanium hinge-pin braces—HCR-01724; \$28 each

HPI

Steering upgrade—B045; \$15

INTEGY

MSR4 shock set (purple)—T7014, \$129.99

ENGINE AND ACCESSORIES

GOLDEN HORIZONS

1/8 tuned pipe (dual stinger)—Item no. 08105; \$35

GPM

Aluminum clutch shoes—SAV1215; \$13

HARDCORE RACING COMPONENTS

O.S. RC Mutant head—HRC00143; \$69 each

HPI

Flywheel—86078; \$8

Clutch nut—86076; \$2

Spacer—Z694; \$1

Clutch-bell bearing—B021; \$14

Clutch bell—A989; \$11

Clutch-bell spacer—86121; \$2

NEW ERA

Bolt-on adapter for O.S. RG—TRM505; \$20

Close header for .21—TRM501C; \$25

O.S. RG-X Engine—13612; \$140

ELECTRONICS

HITEC

Aggressor radio with Spectra module &

Novak receiver—127755; \$300

HS-5475HB servo—35475J; \$50

BODY, WHEELS & AND TIRES

HARDCORE RACING COMPONENTS

Matrix rims—HCR-01774; \$210

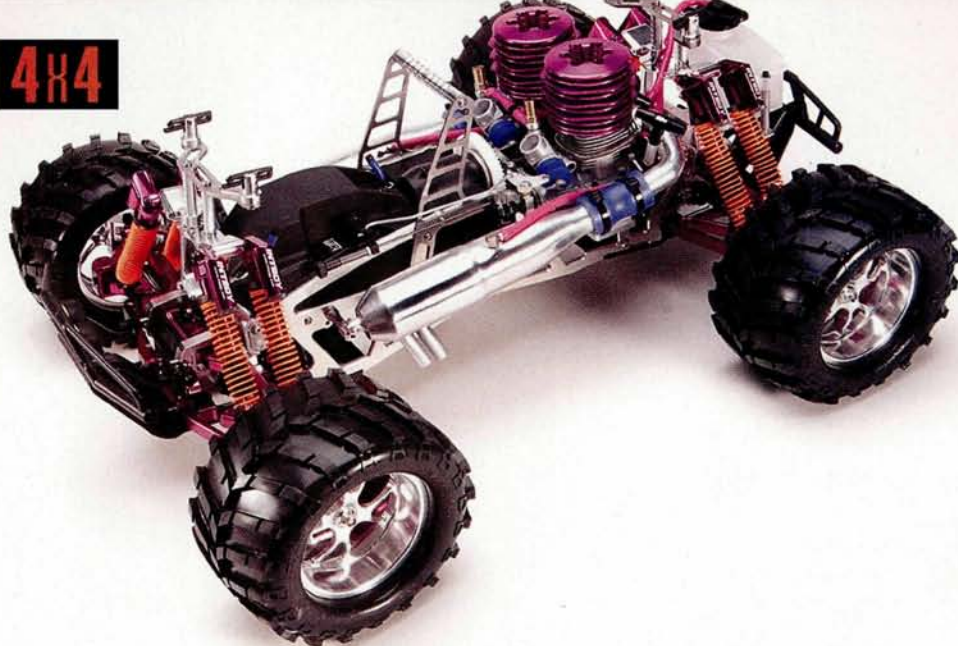
HPI

2002 Dodge Ram Truck Body—7178; \$27

PRO-LINE

Masher 2000 tires—1075-00, \$29

Total cost: \$2,817.99

4x4

THE CONVERSION KIT

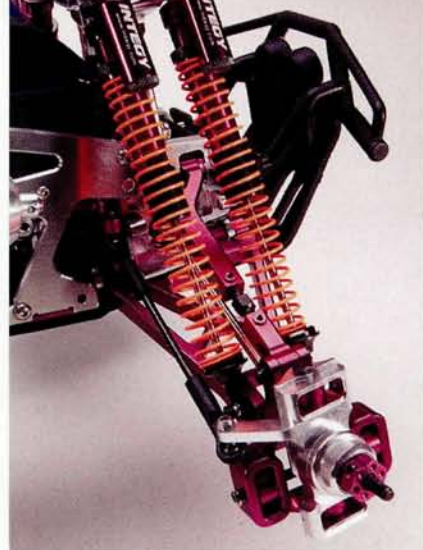
New Era's conversion kit includes machined-aluminum side plates that are 25mm longer and 0.8mm thicker than stock to increase stability and durability. The stock rear drive shaft is too short to accommodate the longer chassis plates, so New Era includes an extra-long, solid titanium shaft. The engine plate is designed to accept two engines (obviously), and engine mounts are included. Since the second engine takes up the spot where the stock fuel tank is located, the kit includes a new 125cc fuel tank and a trick aluminum mount to install it between the chassis and the rear bumper.

New Era also had the foresight to sort out the linkages required for dual

slide carbs. Everything you need to make the linkages is included, and the instructions do a good job of walking you through the setup.

BIG-POWER DRIVE-TRAIN MODS

Dual engines means double the load on the drive train, so a few durability upgrades were in order. GPM's heavy-duty nylon and titanium gear set went into the transmission. The grease-filled differentials also needed attention. I filled them with 10,000WT silicone fluid rather than grease to prevent them from "unloading." I ditched the stock outer diff housings for a set of



That suspension can almost be used as jewelry. Golden Horizons does a great job of machining aluminum. And the shocks? They're very smooth and are a great addition to the truck.

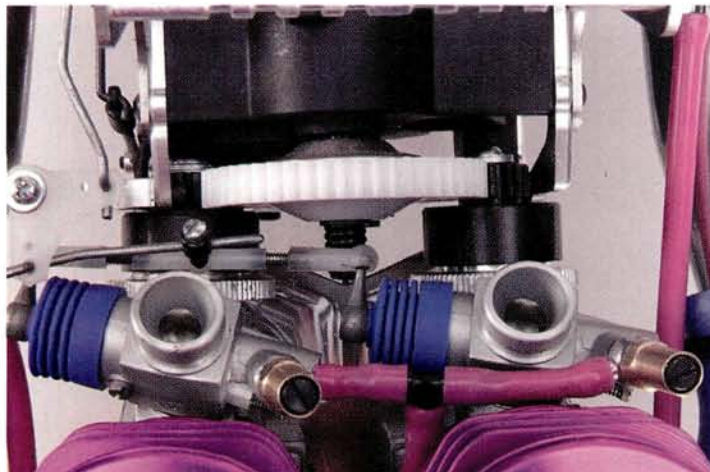
XRAY M18

4WD SHAFT-DRIVE 1/18 MICRO CAR



IT'S FUN, IT'S MICRO, IT'S

XRAY



Setting up the dual linkages wasn't too bad thanks to New Era's instructions. All that was needed was a little time. New Era's included linkages work like a charm.

machined-aluminum ones from GPM. HPI's heavy-duty, chrome-plated dogbones and machined-aluminum hubs from Golden Horizons finished off the drive-train mods, but the brakes were still stock. To better cope with the Savage's increased weight, I installed a set of vented-steel rotors from GPM. They're prototypes but should be available by the time you read this.

DAMPING FOR DUAL ENGINES

With the heft of an extra engine on board and the longer, thicker chassis plates, the dual-engine Savage was shaping up to be a shock-absorber

abuser. For extra durability (and sheer style), I added a set of Integy threaded-aluminum reservoir shocks. The reservoirs are functional and help keep shock action smooth even throughout the long stroke range. I also added aluminum upper and lower arms, shock towers and hub carriers from Golden Horizons. The lower arms feature multiple shock-mounting positions, and the upper arms are adjustable. All that flex-free aluminum is tough on bulkheads and hinge pins, so I installed GPM aluminum bulkheads and Hardcore Racing titanium hinge-pin braces.

GETTING THE ENGINES IN

Obviously, any dual-engine vehicle should have matching engines in equally good condition. That left me with two options: buy a well-used HPI .21 engine to match my thrashed-out stocker or get two new engines. I thought about it for exactly one nanosecond and then ordered a pair of O.S. RG-X engines for the Savage. As a "sport" .21, the RG emphasizes reliability over power, but in a dual-engine vehicle, reliability is far more important than power. And since two of 'em are in the truck, I'll still have more horsepower than I can use. I topped off the engines with a set of trick heads from Hardcore Racing Components. It's a tight fit between the heads, and I had to file down the sides a little to mount them so they wouldn't interfere with each other. The exhaust system also needed some tweaking. HPI offers a header to fit the RG engine, but it's designed to fit a left-side pipe only. To solve the problem, I used a set of round port adapters and headers from New Era. The exhaust from each engine exits through tuned pipes from Golden Horizons.

FINISHING TOUCHES

My Savage is much heavier now, thanks to all the aluminum and the extra engine, so a high-torque steering servo is a must; I went with a Hitec HS-5475HB, which tugs hard at the wheels with 61 oz.-in. of torque.

XRAY M18

... THE EMBODIMENT OF MICRO CAR INNOVATION



The superb craftsmanship and attention to detail are clearly evident everywhere on the M18... the high-performance 4WD drive shaft drivetrain... the well thought out chassis layout... the fully independent suspension... the smooth flowing design of every part...

On high-speed asphalt tracks or short twisty indoor tracks, whether driving for fun or racing to win, the M18 delivers outstanding performance, speed, and precision handling. M18 - your licence to win.

The new XRAY M18 is a unique 1/18 micro-sized model racing car that is the epitome of fine distinctive design of a high-competition racing car. M18 offers highest performance, responsive handling, and traditionally exceptional XRAY quality, engineering, and design.



How about those disc brakes; they really slow the truck down. The tranny is full of nylon and titanium gears from GPM.

I also put Hitec gear to work in the radio department with an Aggressor CRX FM system. As tempting as it was to leave the beautiful chassis "naked," I went ahead and covered it with a body. It's an HPI Dodge Ram with paint by Bill Zegers. Hey, a trick truck has to have trick paint, right? Pro-Line Masher 2000 tires give my truck tons of traction, and they look great. I glued the tires to a set of Matrix aluminum wheels from Hardcore Racing Components.

PERFORMANCE

Whenever you have a truck with dual engines, you need to spend a little quality time with it before you get to enjoy all your hard work. I broke in and tuned each engine individually, since it's hard to hear what's going on with the settings when both engines are singing in your ears. Once both engines had been tuned to my liking, I fired them up. The sound of the two engines running together is indescribable: it isn't merely loud, but it's a harmonic hum that sounds like a chainsaw running through a marshal stack with lots

of reverb. Man, this truck accelerates hard! The tires just spin and throw dirt everywhere as the rear end sags and the truck takes off. I geared the truck to have a lot of low-end grunt rather than top-end speed, and it shows off that power when you drive it on pavement. With all the traction that the asphalt provides, the front wheels come off the ground effortlessly when you open up the carbs. I put the sucker on its lid several times and had to richen up the low-end mixture slightly on both engines to make it more controllable off the line. Top speed isn't as quick as the stock Savage's because of the gearing I used, but I'm confident that the engines have enough power to push the truck up to 50mph with the proper gearing installed. Things got a little hairy when turning at high speed: the extra-high CG causes the chassis to roll a lot. It's easy to roll the truck up onto two wheels if you aren't careful; slowing down before turns is a must! Speaking of slowing, braking is even more important now that the truck is heavier and faster. The GPM disc brakes worked great, and I actually flipped it over on its lid again because I grabbed too much brake. Not bad considering that my dual-engine Savage weighs 8 ounces more than the stock version.

SOURCES

GOLDEN HORIZONS ENTERPRISES CO. LTD. (604) 331-2526; ghobby.com.

GPM distributed by Hobby Etc. Inc. (603) 595-8549; hobbyetc.com.

HARDCORE RACING COMPONENTS (661) 294-5032; racinghardcore.com.

HITEC RCD INC. (858) 748-6948; hitecrd.com.

HPI RACING (949) 753-1099; hpiracing.com.

INTEGY; integrity.com.

NEW ERA MODELS (603) 888-4453; neweramodels.com.

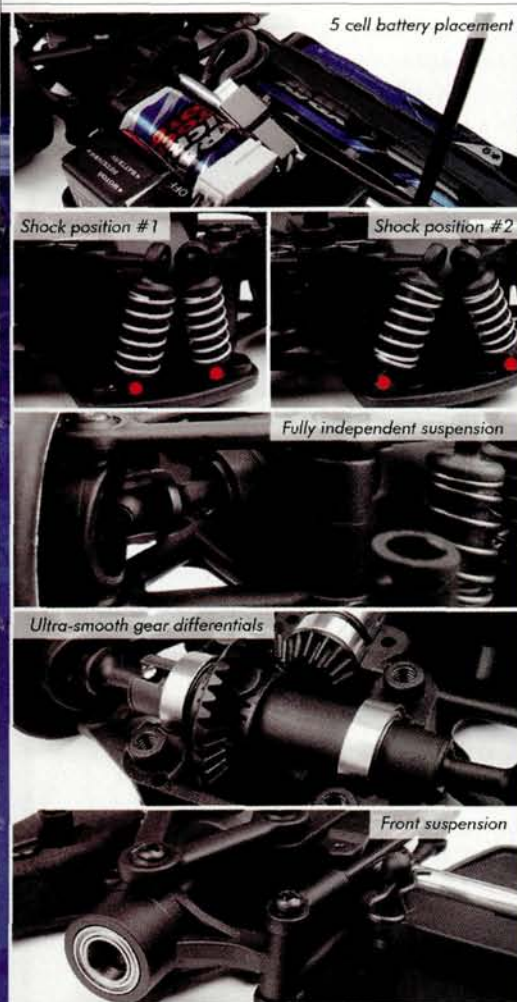
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Convert your TRX 2.5 engine into an Italian Outlaw!



The Traxxas TRX 2.5 is a special engine; it easily tops the performance charts for all RTR small-blocks and even for many aftermarket engines.

This is probably the first case in which its engine really adds to the appeal of an RTR vehicle.

Sirio, an Italian engine manufacturer that makes top-of-the-line racing engines for all competition classes, has a plan to make the TRX 2.5 engine even better. It has developed a line of replacement parts for it that will extract even more performance from this already powerful mill.



The Sirio sleeve features 6 transfer ports for increased air and fuel flow, and that results in more power.

Piston and sleeve. Sirio's piston for the TRX 2.5 is milled out of solid, bar-stock aluminum. It's actually makes the piston fractions of a gram heavier than the stock cast piston because it's slightly beefier, but many engine experts prefer bar-stock pistons because they're stronger and last longer. They're also more expensive.

Sirio's brass piston sleeve has a hard chrome-plated bore. Although the materials and general construction are similar to those of the sleeve in the 2.5 engine, the similarities end there. The stock TRX components are excellent, but the Sirio sleeve shows its high quality.

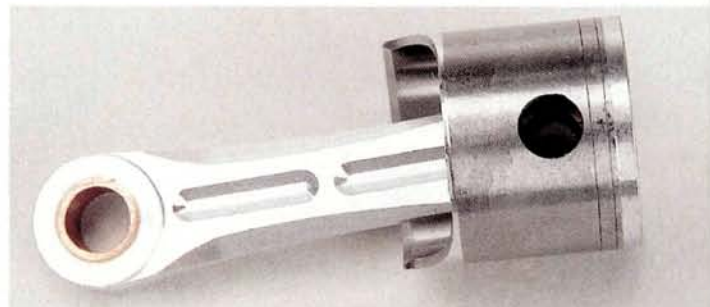
The 6-port sleeve has 2 boost ports, 2 transfer ports and 2 guide ports. That's twice as many ports as the stock piston sleeve. It all still fits in the stock engine block and uses the existing transfer

ports, but it has been proven that adding ports, as long as they're effectively used, increases power.

I measured the timing of all the ports (the intervals between when the ports open and close), and the Sirio sleeve is remarkably close to the original one. The boost and transfer ports stay open just slightly longer than in the stock engine, but the exhaust has fractionally less duration. Power increases in this case probably have less to do with port timing and more

to do with increased port volume; the engine can simply breathe a little better with the added ports.

Connecting rod. Sirio's conrod is a worthwhile piece, but it's intended more for durability than performance. It's made of the same premium-quality alloy as the conrods in Sirio engines; it has been well-machined to reduce windage in the crank, and it includes an upper rod bushing (the stock rod does not).



The piston is milled out of solid bar-stock aluminum, which makes it more durable. Note the band that is machined around the piston's top edge. This makes the "pinch area" wider and increases the life of the piston.

Turbo crankshaft. This is not popular because most consumers believe that any power gained by installing the Sirio components will come from the piston and sleeve. Although I'm certain that the piston and sleeve account for some of the power increase, the crankshaft would also be a worthwhile

investment. It fits a little more snugly in the bearings that make the crankcase a little more airtight, and the bearings are less likely to slip on its surface.

The crankshaft induction port features slightly longer duration by a few degrees. That it stays open longer results in more air and fuel getting into the engine, and that means more horsepower. Additionally, the center port of the stock crank is about 7mm in diameter; the port of the Sirio crank is 7.9mm and allows roughly 13 percent greater air/fuel flow than the stock does. The Sirio crankcase also features a "turbo" port in the face of the counterweight to further improve air/fuel scavenging.



The Sirio turbo crankshaft features a nearly 13-percent-larger center port and increased induction timing to help produce more power.

TESTING

We installed all the Sirio engine components in a well-used Traxxas TRX 2.5 engine. The condition of its piston and sleeve had deteriorated so much that it was time for a rebuild anyway, so it was a perfect time to install the Sirio parts.

After a deliberate and cautious break-in period, we took the freshly rebuilt TRX engine to the same track as we had run this particular T-Maxx countless times before. Just a little fine-tuning brought the engine right into range.

Impressions? Definitely faster. It didn't stand out in one particular area; it was just stronger throughout the entire range. The increase in power was obvious enough to encourage a few track regulars to



ask "What the heck is in that thing?" The beauty of this is that there isn't any outward indication that anything has changed; it looks the same as any other TRX 2.5, so you can let them in on the secret, or you can just keep them wondering why your truck is regularly motoring past theirs.

Depending on where you buy your Sirio TRX parts, the whole lot may cost you more than the TRX 2.5 engine itself. So, if you're looking for some cheap horsepower, this isn't the place. These components are intended to replace the stock parts once they're worn, so you can chip away at a better engine one piece at a time, but it won't be cheap. But if you want to have mad power under the hood of a TRX 2.5, these parts will get you going. You can go for the whole enchilada and buy all of the parts at once, or you can add one at a time as needed.

SPECS

STOCK

TRAXXAS TRX 2.5 SIRIO

Piston sleeve

| | | |
|------------------------|----------------|---------------|
| Exhaust port opens | 110 deg. ATDC* | 112 deg. ATDC |
| Exhaust duration | 140 deg. | 136 deg. |
| Transfer port opens | 125 deg. ATDC | 124 deg. ATDC |
| Transfer-port duration | 110 deg. | 112 deg. |
| Boost port opens | 124 deg. ATDC | 123 deg. ATDC |
| Boost-port duration | 112 deg. | 114 deg. |

Crankshaft

| | | |
|-----------------------|----------------|---------------|
| Outside diameter | 11.2mm | 11.2mm |
| Center port diameter | 7mm | 7.9mm |
| Induction port opens | 146 deg. BTDC* | 146 deg. BTDC |
| Induction port closes | 52 deg. ATDC | 55 deg. ATDC |
| Induction duration | 198 deg. | 201 deg. |

*BBDC = before bottom dead center *BTDC = before top dead center

*ATDC = after top dead center *ABDC = after bottom dead center

Item no.

Item

Price

| | | |
|-----------|-----------------------|------|
| T15041322 | Piston and sleeve | \$65 |
| T15073020 | Double bushing conrod | \$35 |
| T15083200 | Turbo crankshaft | \$50 |

What are port timing and duration?

Port timing is simply the point at which a port opens and closes, and it's measured in degrees of crankshaft rotation. When an engine is described as having an exhaust-port timing of 110 degrees ATDC (After Top Dead Center), it means that the crankshaft will rotate 110 degrees from when the piston is at the very top of the cylinder to when the exhaust port begins to open. Likewise, it will close at the same number of degrees before it reaches top dead center again. This means that the exhaust is open for a total of 140 degrees of rotation.

What does the number of degrees of port duration tell you? As you learn more about engines and you repeatedly see these specifications, you'll start to know the type of results certain specs will produce. Long port duration usually results in a higher-revving, more powerful engine. It also, however, reduces the engine's bottom-end performance, so there's always a tradeoff. When you gain in one area such as peak horsepower, you may lose in others, such as fuel economy and torque.



SOURCES

SIRIO; distributed exclusively by Trinity Products Inc. (732) 635-1600; teamtrinity.com.
TRAXXAS CORP. (972) 265-8000; traxxas.com.

HOBBICO

BY PETER VIEIRA

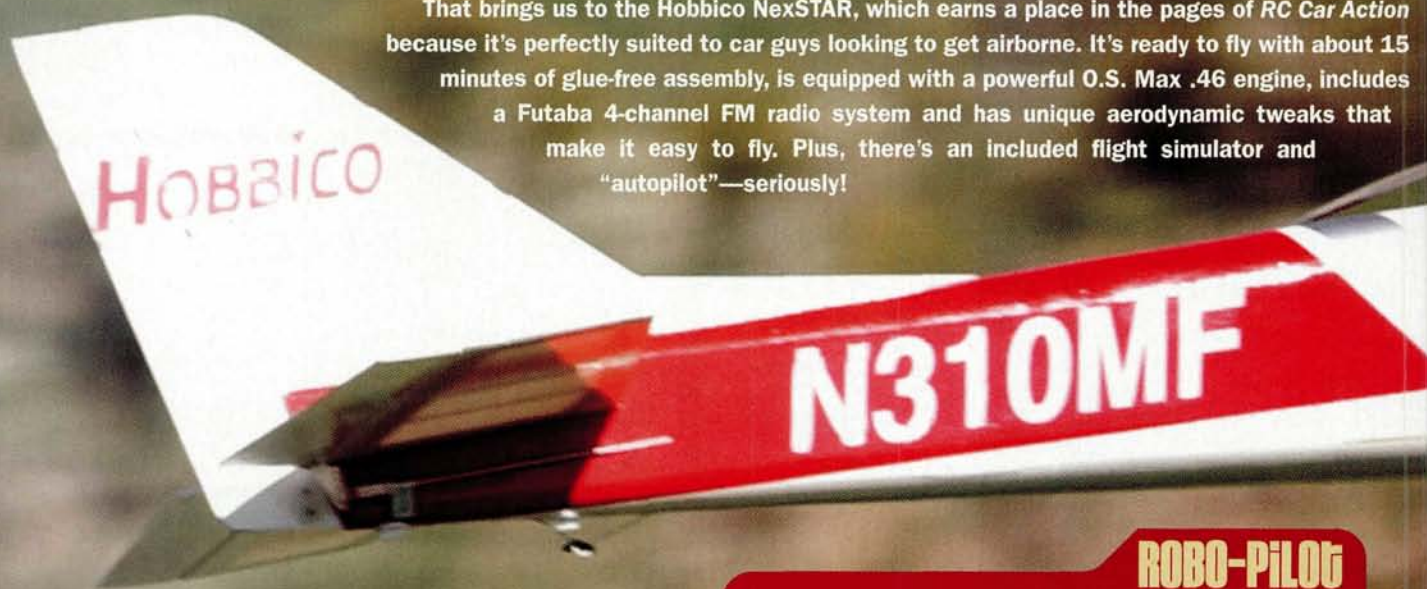
NEXSTAR SELECT

A PLANE FOR CAR GUYS!

never been that easy to get into. You could start with a light, slow-flying foam job, but after you've been spoiled by 50mph-plus RC cars, those little planes just don't do the trick. Or, you could go all-out and build up a trick plane, but how do you learn to fly it? Planes don't take to crashes as well as cars do!

That brings us to the Hobbico NexSTAR, which earns a place in the pages of *RC Car Action* because it's perfectly suited to car guys looking to get airborne. It's ready to fly with about 15 minutes of glue-free assembly, is equipped with a powerful O.S. Max .46 engine, includes a Futaba 4-channel FM radio system and has unique aerodynamic tweaks that make it easy to fly. Plus, there's an included flight simulator and "autopilot"—seriously!

If you're like most RC guys, you have one primary RC mode (in our case, cars) but are interested in RC anything—especially if it flies. However, high-performance RC flight has

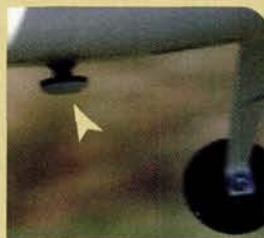


CRASH WITHOUT CRASHING!



The NexSTAR is the first RC airplane to include flight-simulation software, and it's the best you can get: RealFlight. The software lets you "fly" the NexSTAR on your PC, using the actual Futaba radio included with the plane. The photo-realistic graphics are excellent, and the software does a great job of duplicating the physics of flight. Thanks to RealFlight, you can hone your flying reflexes before you ever get on the flightline, sparing your plane from rookie goofs.

ROBO-PILOT



Learning to fly in the virtual world of RealFlight goes a long way in preventing the crashes most new pilots have to endure, but it's just the first step in Hobbico's master plan to make flying easy. The biggie is NexSTAR's Active Flight Stabilization system, or AFS. It's part of the plane's Futaba electronic gear, and uses a sensor under the fuselage to detect light. In a nutshell, the AFS system automatically orients the plane so that "dark" (the ground) is down, and "light" (the sky) is up. If you get into trouble, just release the radio's sticks, and the AFS will take over to return the NexSTAR to level flight. As soon as you grab the sticks, you're back in full control.

O.S. Power!

The NexSTAR includes a genuine O.S. Max engine, and it's a powerful .46; most planes the size of the NexSTAR run on a .40. The extra power is great for performance and gives the pilot an extra margin of safety, as power and altitude are a pilot's best allies. To guarantee first-time success, the engine is tested, tuned and broken in at the factory, and the high-end needle has a limiter that prevents the carb from being tuned out of its optimum range. The limiter also extends the needle, so you can adjust it without getting your fingers too close to the prop—we like that.



Airborne!



As the NexSTAR sat safely in its box, I began accumulating stick time on a virtual flying field, courtesy of RealFlight. *Model Airplane News* associate editor (and crack pilot) Rick Bell gave me some pointers, but otherwise I learned how to fly by flying virtually. I'm glad I did; my flying instincts were usually bad, and I often rolled the pixilated airplane the wrong way

and crashed when making landing approaches. But after a few sessions, I programmed myself to make the right moves, and I felt ready to take over the sticks "for real."

As good as the NexSTAR is, a new pilot shouldn't attempt to fly it (or any full-size trainer) for the first time alone. So, Rick came along to help me out, and we had the NexSTAR idling on the flight line in just a few minutes. With a few hours of RealFlight stick time under my belt, a calm sky to fly in and Rick ready to take over, I had no worries about my first flight.

Takeoff was easy thanks to the tricycle landing gear, and the big plane felt very sta-

ble as it climbed. I made gentle turns as I brought the NexSTAR to a safe altitude and felt more confident with each move. Flying is a lot different than driving; airplanes don't react instantly to inputs, and you must always manipulate the controls to keep the plane on course and at the altitude you want. It's challenging, and a lot of fun. After a few laps above the field, I decided to try flying inverted, but I lost my sense of direction and had trouble getting back in sync with the plane. I let the AFS take over, and the NexSTAR leveled itself out with barely any loss of altitude. I decided to put any more aerobatic flying on hold and went back to practicing turns.

Rick reminded me that the fuel wouldn't last forever, and he suggested that I bring the plane back to terra firma. I thought about handing the controls over to Rick, but decided to try landing on my own. I slowed to what I felt was a slow landing speed, but Rick told me I could bleed off a lot more speed. I doubt the plane was going more than 15mph when I finally lowered it onto the grass runway, and that alleviated just about all my fear of crashing. Nice plane!

SOURCES

HOBBICO distributed by Great Planes Model Distributors
(217) 398-6300; (800) 682-8948; hobbico.com.

Mask Like a Pro!



Whether you paint an automotive mural, a motorcycle helmet or an RC body, preparation is a key element to achieving an excellent finish, and when it comes to Lexan RC bodies, a key part of the preparation process is masking. When

paint jobs go bad it is often because of problems

with the masking.

To illustrate common masking techniques and provide you with some tips (so your good body doesn't go bad!), I painted a Protoform Vauxhall Astra coupe.

I replicated identical designs on the left side using liquid masking material and on the right side using masking tape. Come into the "Shop" and check it out.

Liquid mask and masking tape are the main masking materials for Lexan bodies.



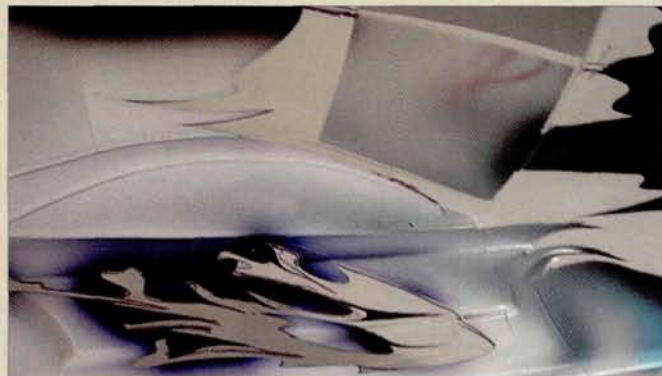
Masking basics

To the uninitiated, many wild paint jobs may look impossibly complex to duplicate, but most designs follow a simple sequence of painting steps; just think of it like those coloring books with painting by the numbers. Every segment of a design is painted independently.

RC bodies follow an easy format. The entire inside body is masked off, and only certain sections of it are revealed and painted at a time. Two common masking methods exist. One is to carefully mask a body using painters' masking tape, and then cut away the mask and apply paint where needed. The second method is to apply a coat of liquid mask—liquid latex—to the inside of the body. It dries to create a solid, form-fitting, rubbery layer. In either case, the design is typically sketched on the outside of the clear body and its shapes are cut into the masking to be removed when you paint the exposed areas.

Using masking tape

There are many brands of masking tape, but it's important to use one that is marketed specifically as painters' masking tape. This tends to have lower adhesion or "tack," which makes it easier to remove and limits the lifting of painted areas, and it's thinner and more flexible. A safe bet is Parma's new Fastape; it is very flexible and has just the right amount of tack. Also, keep in mind that the edges of all masking-tape pieces must be fully rubbed down or "burnished" to prevent paint from bleeding under their edges. Depending on the size and complexity of a design, masking tape can be used in three ways:



1. STANDARD METHOD. Lay the masking tape evenly over a section, and then cut and remove the tape from the areas you want to paint. In this case, you cut the shapes of a design while the masking is on the body. You then have to cover any remaining open sections to prevent overspray from spoiling your work. This method is good when a paint job has some design flexibility and/or when applying set masking forms isn't practical. Don't use the edge of masking tape as it comes off the roll for your paint edges. Instead, place the tape down, and cut its edge with a sharp blade. You'll have crisp edge lines as a result.

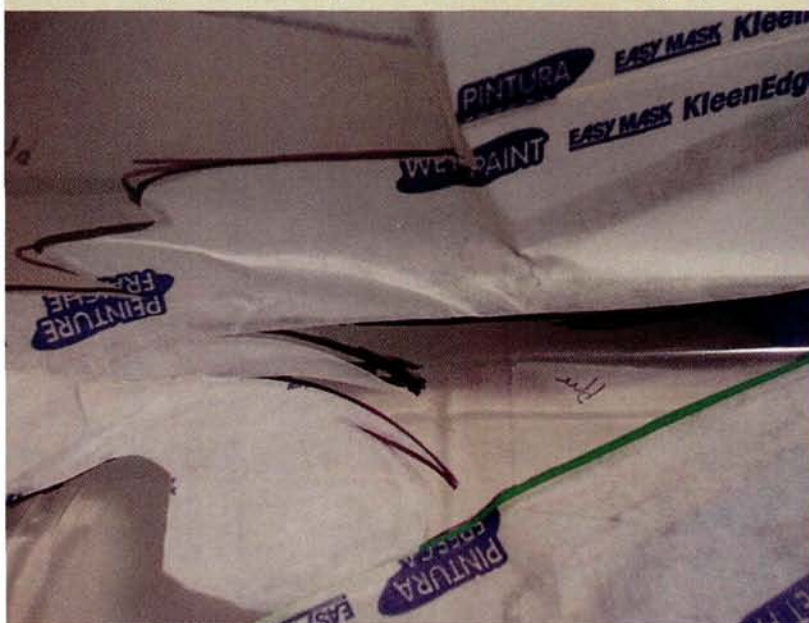
Using masking tape continued

2. PRECUT METHOD. The alternative method is to use pre-cut masks and apply them to the body. This technique is excellent for intricate, well-defined graphics and for areas of a body that are difficult to blanket-cover because of their complex curves. Graphics can be cut out of masking tape on a nonstick cutting board, or you can use a trick I like: stick enough masking tape on a piece of household wax paper to cover a particular graphic; sketch a design on the tape, and then, with fine scissors or a razorblade, cut out the design—and you'll have a perfect mask. Peel off the wax paper and apply the mask when needed.



You can create complex masks by laying masking tape on wax paper and cutting out your designs. This is much easier than trying to cut the design out on the body.

3. VINYL-TAPE EDGE. Less complex designs can be laid out on a body using a plastic fine-line tape such as Pactra's Trim Tape to get a clean edge. Unlike standard masking tape, vinyl tape has a clean edge right off the roll. Remaining areas of the design are then back-filled with masking tape.



For super-clean straight lines, use plastic fine-line tape to make an edge. For complex shapes, cut a design out of a solid piece of masking tape.

Using liquid mask

Compared with masking tape, liquid mask is much easier to use, but it lengthens the painting process because it takes time to dry. I like to use Bob Dively's brand, though other manufacturers also market their own versions. Straight out of the bottle, liquid mask is a very thick, glue-like substance that you can brush directly onto a body. Here's what you need to know:

Liquid mask can be sprayed on with an airbrush or evenly spread with a foam or bristle brush. For best results, alternate the direction of the layers as you apply them.



STANDARD APPLICATION. Brush a thin, even coat over the entire body, and allow it to dry thoroughly before reapplying. An unevenly applied coat of liquid mask will dry more slowly and result in inconsistencies that may make its removal difficult.

AIRBRUSHING LIQUID MASK. You can avoid problems such as slow drying by spraying liquid mask with an airbrush, but you must thin it first. Dilute the liquid mask in a suitable spray bottle by approximately 10 percent with water, and apply three to five even coats, depending on its consistency. Typically, I like to spray a dilution that is as thick as can be sprayed through my airbrush; doing so reduces the number of coats and the drying time needed. This technique creates a perfectly even coating that is a perfect masking layer.



The results of liquid mask are very fine and clean edges. Although drying eats up a lot of time, liquid mask does offer very good and consistent results.

WORKING WITH LIQUID MASK. Once it's dry, simply cut out the segments of a design with a razorblade, then remove the mask and paint. Liquid mask automatically seals its own edges and is impervious to all types of paint. It is very easy to cut and creates super-sharp lines. When



Liquid mask is cut and carefully lifted off the body before a section is painted. It might look complex, but it is easily done one step at a time. Patience is key.

removing sections of liquid mask, do so carefully to avoid lifting any adjacent sections. If a portion is accidentally lifted, let it fall back onto the body, and it will readhere.

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Universal masking tips

Regardless of which masking method you choose, here are a few tips that will help ensure a top-quality finish:

■ Before masking a body, thoroughly clean off any dirt or residue that could inhibit paint adhesion. Wash the body gently with soap and water, or wipe it down with a mild solvent, e.g., rubbing alcohol.

■ Throughout the painting process, avoid touching exposed areas; oils from your skin will prevent paint from sticking properly to the body.

■ Typically, cut mask using a no. 11 hobby-knife blade. To make clean and easy cuts, use a new razorblade every time (you may even want to use more than one fresh razorblade per body).

■ Press a razorblade just hard enough to cut through the masking but not so deeply that you score the underlying Lexan.

■ Whenever possible, remove the mask for the dark colors first. Always try to paint starting with the darkest color.

new in the shop

Spaz Stix Paints Surface Pre-Prep

You absolutely must start with a clean surface to achieve great results when painting RC bodies. There's dirt, dust and oil from your own fingers as well as a mold-release agent left over from the manufacturing process, and they'll all work against you in your quest for the perfect, most killer paint job. Spaz Stix paints make getting a spotless starting surface a whole lot easier with its Surface Pre-Prep. The heavy-duty cleaner comes in a 3.5-ounce aerosol can that should last you through a few paint jobs. Surface Pre-Prep—item no. 90059, \$6.



CONCLUSION

Masking a complex paint design may seem complicated, but if you do it step by step, it is much easier. Before the paint starts flying, think through the entire process to identify the sequence and the methods you'll want to use. With a little practice and experimentation, you, too, can become a master of masking. See you next month.



SOURCES

BOB DIVELY MODELS (216) 953-9254; bodbdivelymodels.com.

PACTRA INC. distributed by Testor Corp.

PARMA (440) 237-8650; parmase.com.

PRO-LINE (909) 849-9781; pro-lineracing.com.

PROTOFORM INC. distributed by Pro-Line; pro-lineracing.com.

SPAZ STIX PAINTS (800) 622-7223; spazstix.com.

TESTOR CORP. (815) 962-6654; testors.com.

DETAILING DILEMMA?

Send your Body Shop questions and comments to Josh Thiel josth@airage.com.

1 TUNE YOUR TIRES TO THE TRACK

Rubber sedan tires are notoriously sensitive to track temperatures. That's why many tire manufacturers rate their products for use in different temperatures. But what effect does this actually have? A tire rated for hotter temperatures will resist breaking down or "shredding" on asphalt that's hot enough to fry an egg on but will be too hard to run on a cold track because it won't be able to generate enough grip. On the other hand, a cold-rated tire (usually soft and sticky) might last only one run on a hot track—slipping and sliding around as it wears its way into oblivion. You can use your temp gun to find out the track temp before your run, and that will help you choose the appropriate tires. And remember: track temps can change throughout the day, so the tires you used in your midday qualifier might not work as well in the late afternoon main event.



Track temps change throughout the day, so get the extra edge by knowing which tires you should use before you hit the pavement.

2 TEMP-TUNE YOUR GEARING

It's no secret that over-gearing your car can do some serious damage to your motor. Not only can you burn up your brushes and commutator, but you can also damage your magnets. Brushes can be replaced, and you can usually skim a comm back to top performance, but magnets are another story: it's pretty hard to restore a strong field to a magnet that has been damaged by overheating. Slightly over-gearing your car may not do any long-term damage, but your motor might feel soft in the closing minutes of a race even if there is plenty of battery juice left. Take a few seconds to temp your motor can after a hard practice run. But there is a catch: different motors run best at different temperatures. So start off with conservative gearing to get a baseline temperature. Then, after your motor has completely cooled, do another run with it geared a bit taller, and so on, until the motor temp is drastically higher than on its previous run. Then back off on the gearing a bit, but make sure that you can still reach top speed before the end of the longest straight.



Do you need a laser?

All temp guns perform the same basic function: reading the average temperature of an area. Some of the more expensive ones have a built-in laser pointer to aid in pinpointing a target surface. Laser targeting isn't crucial for RC application because we tend to get right on top of what we're temping. If you do get a gun with a laser, be cool with it—don't zap anyone in the eyes (including yourself).

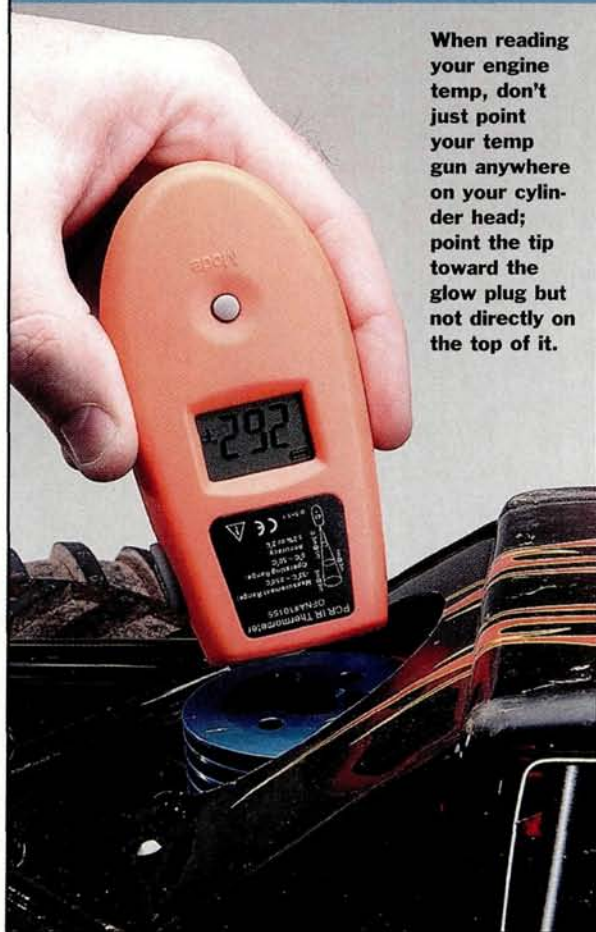
Unless you want to use your temp gun to point out stuff on blackboards or mess with movie screens, you don't need a laser option.

temp-gun tips

It may be fun to point a temp gun around at random objects, but pointing it randomly around your car won't do you any good. When you temp a nitro engine, aim the temp gun near the glow plug. Just on the other side of it, underneath that aluminum head, is where combustion occurs; the area surrounding the glow plug is the hottest external point on the engine. When you temp your engine, don't do it after a few lazy laps around the track. You must push it to simulate race conditions. And don't bring it in to check it after a couple of laps. Run it hard for a few minutes to get it up to temp, bring it in and then check it. If you make needle adjustments, top off the fuel and run it for a few more minutes before you bring it in again. Also, most temp guns are set to read best from dark matte surfaces, not from shiny chrome plating. You should keep this in mind when you point your temp gun at a polished surface and the readout indicates that it's safe to touch. Some models have an emissivity adjustment to compensate for various surfaces, but most in the \$100-and-under range have a fixed emissivity setting.

One more thing: most cheap temp guns are not calibrated to government standards, so you may find slight differences between them. It's best to use your temp gun to get a baseline temperature for your setup and use it consistently. By doing that, you'll know that if your engine runs well at a temp-gun reading of 236 and, the next day, it runs poorly at a reading of 280 degrees, it's safe to assume that it is running 44 degrees too hot, regardless of the true temperature (and with that, you should probably richen your carb settings).

When reading your engine temp, don't just point your temp gun anywhere on your cylinder head; point the tip toward the glow plug but not directly on the top of it.



3 CHECK YOUR BATTERIES

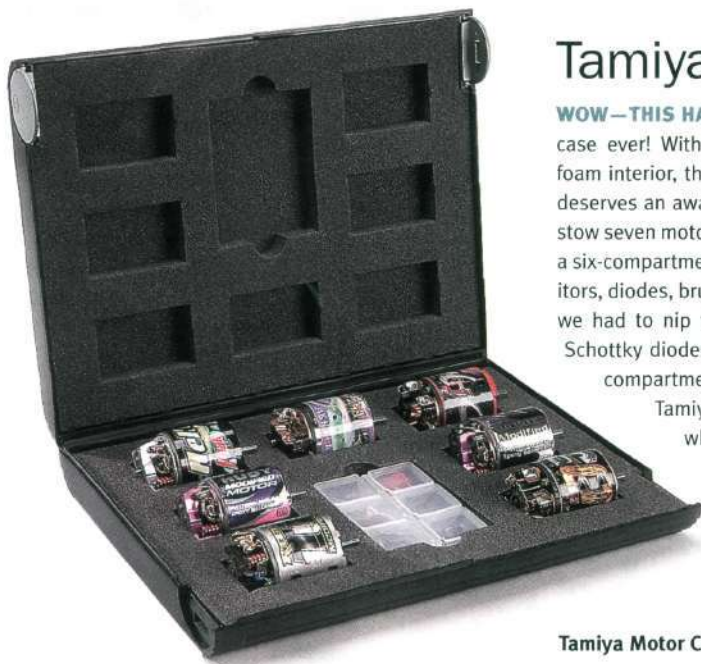
If you have a battery pack that is starting to lose its punch you might have a cell that is going bad. The faulty cell can be picked from the line of suspects by checking their temperatures. A bad cell will get hotter because of a build-up of internal resistance; when it just can't put out juice at the same rate as the others, the result is heat. If you find that one cell is hotter than the rest at the end of a run, even by just a few degrees, it may be time to send it to the battery recycling bin.

You can also use your temp gun to help you charge your battery packs more safely. If you find that your packs come off the charger hot, you are over-charging them. Use your temp gun to check the pack toward the end of its charge. If it registers between 115 and 120 degrees F, it's fully charged and should be taken off the charger.

Measure the pack's temperature near the end of the charge cycle to see how hot it is.

GOT MORE TEMP TIPS?

There are plenty of good uses for a temp gun, and we're sure you can come up with a few other ones. Send your ideas to pittips@airage.com, and we'll publish the best ones in our "Pit Tips" section. Until next time, happy temping! ■



Tamiya Motor Case

WOW—THIS HAS TO BE the best-looking motor case ever! With its discreet latches and fitted-foam interior, this ribbed-plastic, hard-shell case deserves an award for industrial design. You can stow seven motors inside the firm-foam bays, and a six-compartment tray has room for spare capacitors, diodes, brushes, etc. Space is tight, though; we had to nip the leads of our capacitors and Schottky diodes to fit them into the tiny, lidded compartments.

Tamiya's motor case proved rugged in fully loaded testing. The latches opened only when we wanted them to, and the resilient plastic shell resists cracking (but dropping it isn't a good idea—seven motors are heavy). The only thing we found ourselves wishing for was a handle, but if you plan to store your motor case in a plastic tub with the rest of your gear, you won't miss having one. Then there's the price; \$30 isn't cheap, but for high art like this, we'll pay. —*Peter Vieira*



Tamiya Motor Case—OP-634; \$30.

Tamiya America Inc. (800) 826-4922; tamiyausa.com.

RPM Maxx Steering Knuckles

RPM'S NEW STEERING KNUCKLES for the T-Maxx and E-Maxx feature thicker walls and strengthening ribs that resist damage in hard driving or crashes, and are molded of RPM's special blend of nylons for total durability. RPM even guarantees them against breakage. You can get them in black, blue, purple and dyeable white. The knuckles are undoubtedly tough, but the included bearings really pull this product together. They're 3mm larger in diameter (15mm versus 12mm) and 1mm wider, and these much larger balls better spread impact loads.

I installed the steering knuckles on my T-Maxx 2.5 without any problems or modifications. The RPM parts match the stock suspension's geometry, so handling is unchanged. You won't even know that they're there, until you realize that you haven't needed to replace a knuckle or bearing in a long time. When I installed the steering knuckles, I also threw a set of RPM's blue spring cups onto the shocks. The spring cups are designed to hold the springs in place better, and they stay cleaner because of the special nylon RPM uses. Like the steering knuckles, the spring cups come in black, blue, yellow and purple. —*Paul Onorato*

RPM T-Maxx/E-Maxx steering knuckles—80031 (dyeable white), 80032 (black), 80035 (blue), 80038 (purple); \$35/pair.

RPM blue spring cups—73155; \$3/set of four.

RPM R/C Products (909) 393-0366; rpmrcproducts.com.



The RPM knuckle (left) is visibly beefier than the stocker. And look at that bearing—it's huge!



Team Integy Digital Weight Distribution Gauge

TEAM INTEGY'S DIGITAL WEIGHT DISTRIBUTION GAUGE allows the precise measurement of the weight at each wheel of your RC car. With this data and the included worksheets, the calculation of total weight, cross-weight percentage (or wedge), rear-weight percentage and side-weight percentages can now be part of your racing setup.

FEATURES

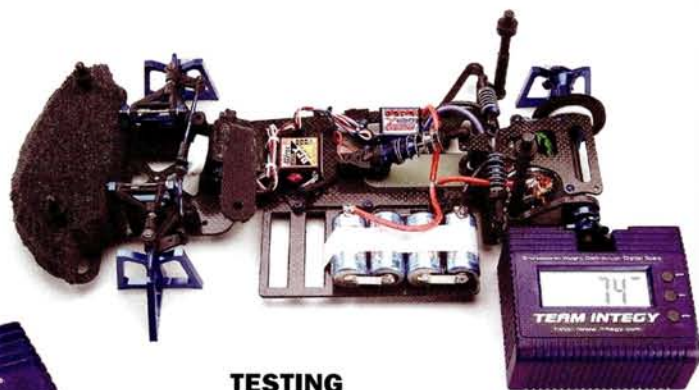
- Digital display
- Displays in grams and ounces
- Operates on 4 AAA-size batteries (not included)
- Digital scale
- Three anodized-aluminum tripods
- Worksheets included
- Calibrated to within 0.1 oz./1g



OPERATION

To use the gauge, you'll need a flat surface, a calculator and, of course, your car. The gauge is easy to use, and the worksheets make the calculation process easy. To get the necessary data, remove all four tires and place the scale under one axle; use the tripods for the other three axles. Measure the weight at each axle by moving the scale to each wheel; record the results on the worksheet.

When you have readings for each wheel, it's time to break out the calculator. The worksheet has formulas for total weight, left-weight percentage, rear-weight percentage and cross-weight percentage.



TESTING

I tested the Digital Weight Distribution Gauge on an Associated TC3, an Associated L40 and a Losi Triple-X. Since I use the L40 and the Triple-X on ovals, I would definitely be able to use the cross-weight percentage. The TC3 turns in both directions, so I used the gauge to make sure that the touring car wasn't tweaked and to check the rear-weight percentage.

The scale worked as promised for each vehicle, and there weren't clearance or compatibility issues. Each time I moved the scale, I zeroed the gauge to ensure accurate results. To test the scale's accuracy, I compared the total weight results of all three vehicles to results taken directly from a professional digital scale, and the Integy unit proved to be spot on.

VERDICT

The Digital Weight Distribution Gauge is an incredibly valuable setup device. You'll not only be able to ensure that you've set up your car properly, but you can also repeat setups very accurately. The gauge works as promised and is of high quality. —Matt Higgins

Team Integy Digital Weight Distribution Gauge—C22330; \$90.

Team Integy; integy.com.

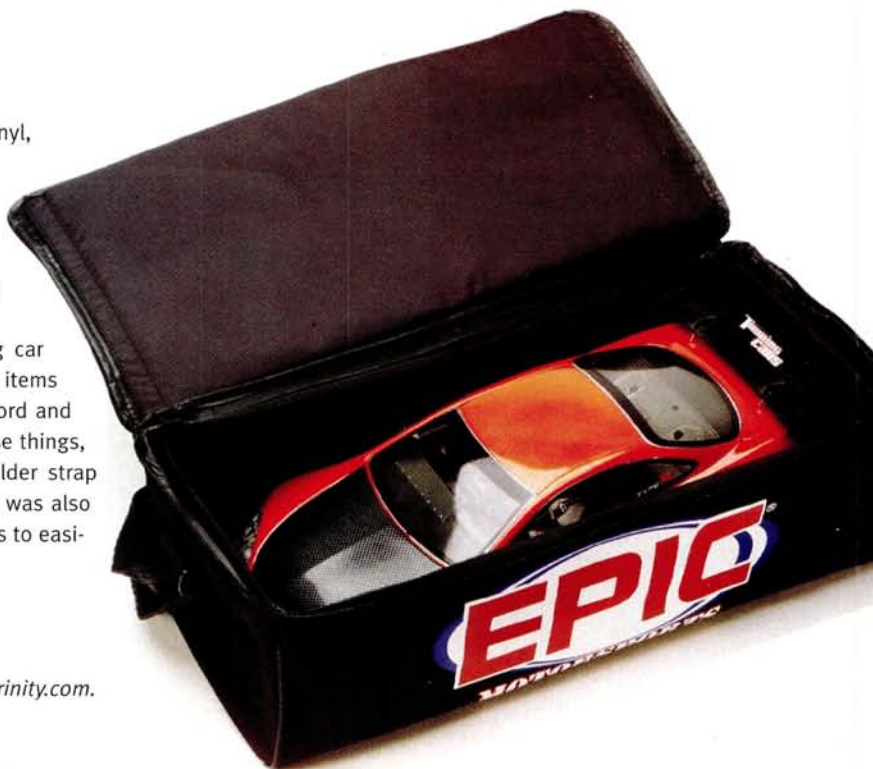
Epic Touring Car Bag

EPIC'S NEW TOURING CAR TOTE is fashioned from durable vinyl, and the top panel zippers open for access to a single storage compartment. Five vinyl reinforcement panels are secured to the sides of the bag with hook-and-loop fasteners; these are much sturdier than an internal cardboard box (as used by most other cargo-bag designs). It takes only a few minutes to install the panels, and the result is a solid transport box.

For about a month, I used the box to schlep my touring car around, but I also tested its strength by using it to carry heavy items such as my charger, power supply, discharger, an extension cord and odds and ends. The Epic box had no problems holding all those things, even with my car resting on top. I also liked the long shoulder strap because it freed my hands so I could carry even more stuff. It was also handy that I could free up pit space by just removing the panels to easily collapse the bag. —Matt Higgins

Epic Touring Car Bag—EP1700; \$35.

Epic; distributed by Trinity Products Inc. (732) 635-1600; teamtrinity.com.



DuraTrax IntelliPeak Digital Pulse Charger

INTELLIPEAK'S DIGITAL PULSE CHARGER (DPC) is aimed at both newcomers and seasoned hobbyists. It's packed with all the features that a racer could want, but it's also designed to be user friendly. Was DuraTrax successful? I tested the DPC to find out.

FEATURES

SOLID CONSTRUCTION. The Digital Pulse Charger is a solid unit; a metal case with plastic legs on all sides provides a secure base. The top of the charger has an LCD screen, four LEDs, a slider switch and a current-adjustment knob. Two spring-loaded, quick-release clips hold the included wire lead that is prewired with a standard Tamiya-type battery connector. The rear of the charger has two cooling fans and a power cord that ends in a connector. This connector accepts the included alligator clip for DC operation or the included 12V, 7A power supply for AC use.

PUSHBUTTON OPERATION. One of the DPC's most outstanding features is that it's very simple to use. One button allows you to select from four charge modes and discharging. A provided cheat-sheet sticker shows how many times and how long the button must be pressed to switch functions, and it indicates the number of times the charger will beep for each selected mode.

LCD DISPLAY. An LCD screen and four LEDs make the charger even more user friendly; just a glance will show you which function the charger is performing. The LCD indicates the charger's voltage and amperage, and it shows the battery's capacity in milliamp hours (mAh). Select between the three readings with a flick of the slider switch. The only downside of the LCD is that it can't display capacity greater than 1999mAh. When it passes this point, it resets; for an accurate reading, you must keep track of the milliamp hours. In addition to the visual cues, the Digital Pulse Charger has several beep alerts that let you know what is going on with your cells.

VARIABLE CHARGE AND DISCHARGE RATES. Adjustable charge and discharge rates are also part of the DPC's many features. A knob on top of the charger allows the user to select a charge rate from between 0.5 to 6.5 amps. A switch on the bottom of the unit sets the discharge rate at 2 or 10 amps. This switch is marked like an on/off switch; the "on" setting is 2 amps; "off" is 10 amps. The cutoff voltage is fixed at 2.60 volts.

MULTIPLE CHARGE MODES. The DPC has four charge modes. When a battery is plugged in, the charger automatically starts a 100mA trickle-charge. A fast-charge mode operates at a user-specified amperage, and the unit has a discharge/charge cycle and an auto-repeat cycle that allow the charger to repeatedly charge and discharge a pack. DuraTrax claims this is an effective way to break in new batteries and to help restore older packs.

COMPUTER-CONTROLLED CHARGING. The DPC can detect whether the battery it is charging is Ni-Cd or NiMH, and it adjusts the settings accordingly. This allows a full charge without the risk of overcharging. A built-in 8-bit, 4MHz CPU with 8K of ROM manages all this. What does this mean? In English, it means that this charger has the processing power to take care of your cells.

TESTING

After reading the instructions, I put the DPC to work on a pair of Peak Performance Power MAXX 2400mAh packs that had been sitting around for a few months. I charged both packs at 4 amps and then ran one in a Traxxas Rustler, while the DPC cycled the other pack with a 10A discharge



rate and 4A charge rate. After the first pack had been run, I used a bulb discharger to discharge it and finished the discharge at 10 amps on the DPC. I then charged it again at 4 amps. After both batteries had been cycled twice, I used a digital voltmeter to compare the data. The pack that had been cycled and recharged on the DPC showed a higher voltage reading of 8.66 volts compared with the truck-run pack at 8.52 volts.

Next, I hooked the DPC up to a few older packs that I use for bashing around. Of the three packs, two were duds, but one pack still put out decent numbers. I cycled the duds to no avail, so they went into the recycling bin. The third pack's numbers improved, though, and the voltage became consistent after several runs in the Rustler and cycling on the DPC. The LCD screen made it easy to track each pack's numbers through multiple cycles.

Last cycled was a pair of 4-cell AA Ni-Cd packs. I adjusted the DPC to discharge at 2 amps and to charge at 2.5 amps. The DPC handled the AA packs flawlessly, and their voltage numbers improved dramatically after two cycles.

Throughout testing, the DPC's temperature never rose too far above room temperature. Its two fans do an effective job of keeping the DPC cool.

THE VERDICT

DuraTrax's Digital Pulse Charger is easy to use, compact, and thanks to its included AC power converter, is also versatile. Its useful features make it easy to track how well your batteries are performing and help you get the most out of every charge. But most impressive is that so many features are packed into a charger that has a suggested retail of \$100. Although it lacks some of the bells and whistles that are found on many pro-level chargers, the DPC can handle almost every charging duty that the average hobbyist would require, from receiver and transmitter batteries to high-capacity NiMH cells. —Nathan Miller

DuraTrax IntelliPeak Digital Pulse Charger—DTXP4130; \$100.

DuraTrax; distributed by Great Planes Model Distributors (217) 398-6300; (800) 682-8948; duratrax.com.



Dual fans keep the charger cool.



The IntelliPeak includes this 7A power supply.

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ALABAMA

Hobby Raceway, Tuscaloosa, Alabama 35405; Mark or Don Holt, 205-759-4517 & 205-333-8679; email: makkholt@aol.com



Mobile Miniature Speedway, Theodore, Alabama 36582; Richard Sweetser, 251-653-6643; email: jbogard@comcast.net; web: mywebpages.comcast.net/jbogard



North Cullman Raceway, Cullman, Alabama 35055; Daniel Lollies, 256-775-2491; email: cullmanrchoobbies@yahoo.com; web: www.cullmanrchoobbies.hometeam.com



Oak Mountain R/C Raceway, Columbiana, Alabama 35051; Matthew Gordon, (205) 669-6837; email: oakmtncraceway@hotmail.com



R/C Hi-Tech Raceway, Huntsville, Alabama 35811; Rick Chambers, 256-539-1347



Spring Cove International Speedway, Florence, Alabama 256-757-1562; email: rvines@hiway.net; web: www.springcovespeedway.com/SpringCove.htm



ARIZONA

HobbyTown Raceway, Tucson, Arizona 85713; Jay, (520) 882-8888; web: www.hobbytown.com



HobbyTown U.S.A., Phoenix, Arizona 85044; Doug McFarland, (480) 598-5282



R/C Sports Mania, Phoenix, Arizona 85017; Gary Dick, (602) 278-3671



Scottsdale R/C Raceway, Scottsdale, Arizona 85251; Scott Anfinson, 480-945-2186

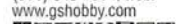


ARKANSAS

Alison Offroad RC Raceway, Little Rock, Arkansas 72206; Steve Alison, (501) 490-1227; email: jason@alisonoffroad.com; web: www.alisonoffroad.com



Grand Slam Hobby, Ft. Smith, Arkansas 72901; Bryon Shumate, (501) 648-1994; web: www.gshobby.com



Sparks R.C. Raceway, Paragould, Arkansas 72450; Tommy Sparks, (870) 239-3606



CALIFORNIA

Capital City R/C, Sacramento, California 95829; Homer, 916-383-3445; email: lanno@pacbell.net; web: www.capitalcityrc.com



Castle Hobbies, San Jose, California 95124; Steve Scott, 408-377-3771; web: www.castlehobbies.com



Crystal Park Raceway, Compton, California 90202-4925; James Reese, 310-631-0307; email: mailto:info@crystalparkraceway.com



Delta R/C Raceway & Hobbyshop, Antioch, California 94509; Rick or Steve, (925) 778-2965; web: www.deltarc.com



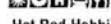
Extreme RPM Hobbies, Grand Terrace, California 92313; Bobby Haney, 909-370-3379; email: Extremerrpmracing@aol.com; web: www.Extremerrpmracing.com



Hobby Central Raceway, Poway, California 92064; Lee, (658) 513-0733; web: www.hobby101.com



Hobby World, San Jose, California 95129; Guy Bassett, (408) 873-2109



Hot Rod Hobbies, Saugus, California 91350; Jimmy Babcock, (661) 255-2404



Jake's Performance Hobbies, Rohnert Park, California 94928; Jake, (707) 586-3375; email: jphracing001@aol.com; web: jphracing.com



Palm Desert Offroad R/C Raceway, Palm Desert, California 92260; Bob Barrett, 760-341-5699; email: htpalmdesert@msn.com; web: www.hobbytown.com



Paradise Hobbies & RC Raceway, Paradise, California 95969; David Lafabregue, (530) 877-6447; email: paradisehobbies@aol.com



Pure Adrenaline RC & Hobby, Sonoma, California 95370; Matt, (209) 586-6232; email: contact@pahobby.com; web: www.pahobby.com



Racer's Haven Raceway, Bakersfield, California 93309; Greg Cooper, 661-835-0441; web: www.racers-haven.com



Rescue Mini R/C Speedway, Rescue, California 95672; Bruce Pease, (530) 621-3948; web: www.innercite.com/~rcracing/



Ripon R/C Speedway, Ripon, California 95366; Dan Tanis, (209) 599-5160



Sacramento RC Racing & Hobbies, Sacramento, California 95824; Andreas Muller, (916) 424-4001; email: andreas123@earthlink.net; web: www.77sunset.com



Showtime R/C Speedway, Bakersfield, California 93301; Don Risner, 661-328-1481; email: showtimespeedway@aol.com; web: www.showtimespeedway.com



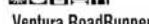
So Cal R/C Raceway, Huntington Beach, California 92646; Jim or Lana, 714-963-7484; email: info@socialrc.com; web: www.socialrc.com



SpeedWorld Raceway, Roseville, California 95678; Billy Bowerman, 916-783-8864; email: speeddog@mindsync.com; web: speedworldraceway.com



The Dirt Valley R/C Racepark, Hemet, California 92344; Joe Christenson, (909) 925-7592



Ventura RoadRunners, Camarillo, California 93010; 805-564-4144; email: dudebigal@aol.com; web: www.venturaroadrunners.com



COLORADO

MHOR R/C Raceway, Aurora, Colorado 80011; Jess A. Brockman, (303) 343-0151; email: questions@mhorr.com; web: www.mhorr.com



Valley West Off-Road RC Club, Grand Junction, Colorado 81504; Jodie Grein, 970-242-1412; email: geerhed@gj.net; web: www.gj.net/~geerhed/vwvordind.html



CONNECTICUT

K&N R/C Speedway Inc., Stafford Springs, Connecticut 06076; Jim or Bill, (860) 684-9896



Manchester Hobbies, Manchester, Connecticut 06040; Jim or Mike Tierini, (860) 643-4768



R/C Madness, Enfield, Connecticut 06082; Christopher Marcy, (860) 741-6501; email: cmarcy@rcmadness.com; web: www.rcmadness.com



SpeedZone Raceway, Cromwell, Connecticut 06416; David Kahn, 860-632-9278; email: info@speedzone-hobbies.com; web: www.speedzone-hobbies.com



Xtreme Radio Control, New Milford, Connecticut 06776; Paul or Pete, (860) 354-4703



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ESRC, Seaford, Delaware 19973; Bill Auchterlonie, 302-734-2757/302-629-3944; email: aeromarine@erols.com



FLORIDA

B&T RC Central, Fort Walton Beach, Florida 32547; Mike or Tim, 850-863-1666



Daytona R/C Racing Assoc., Ormond Bch., Florida 32174; Mike Wichman, 386-677-0898; email: bj@bestnetpc.com; web: daytona-rc.homeip.net



Farmers Hobby Shop & Raceway, Tampa, Florida 33619; Greg Cardone, 813-248-3314; web: www.farmershobby.com



First Coast Speedway, Jacksonville, Florida 32211; Bobby Phillips, 904-716-0861; web: www.firstcoastaustracing.com



G&C Hobby Raceway, Lantana, Florida 33462; George, 561-547-3812; email: gncobbies2@cs.com; web: www.gncobbies.com



GBs Hobbies, Port St. Lucie, Florida 34952; Track Owner, 561-460-2844; email: qaircraft@bellsouth.net



Grand Prix RC Club, Ft. Pierce, Florida 34945; Luther Peterson, 772-473-2130; email: grandprixhobbies@aol.com



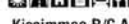
Gulf Coast RC Car Club, Naples, Florida 34105; Mark Benfield, 941-774-7116; email: teamnofear@aol.com



Hobby Central, Pensacola, Florida 32504; Bill McLester, 850-471-9800; email: info@hobbycentralrc.com; web: www.hobbycentralrc.com



Hobby World Raceway, Jacksonville, Florida 32210; Greg, (904) 772-9022



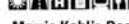
Kissimmee R/C Auto Racing, Kissimmee, Florida 34741; John Rosser, (407) 944-4913; email: john@craftworldflorida.com; web: www.craftworldflorida.com



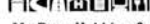
Miami RC Raceway, Miami, Florida 33176; Mickey Cerra, (305) 630-3714; email: miamircraceway@aol.com



Monza R/C Speedway, Miami, Florida; Ed Delgado, (305) 437-9895



Morris Kohl's Raceway and Hobby Shop, Tampa, Florida 33604; Morris Kohl, (813) 931-1626



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NORRA, Naples, Florida 34104; Rob Dondorfer, 239-417-1099; web: www.norra.mainpage.net



Pro Hobbies Speedway, Apopka, Florida 32712; Jim, (407) 886-4615; email: prohobby@juno.com



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South Palm Beach Racers, Boca Raton, Florida 33486; Mike Fazio, 561-338-5367; email: epine01@bellsouth.net; web: http://communitylink.gopbi.com/group/sprclub



Superior Hobbie R/C Parking Lot Racing, Casselberry, Florida 32707; (407) 834-9299; email: racing@superiorhobbies.com; web: www.superiorhobbies.com



SWF RC Car Club, Fort Myers, Florida 33907; Mike Nardone, 941-278-1295; email: swfrcclub@yahoo.com; web: swfrcclub.tripod.com/swfrcclub



Tallahassee R/C Speedway, Tallahassee, Florida 32301; Tim Cook, 850-514-3365; email: idothtre@hotmail.com; web: www.geocities.com/rcdule1/rccars.htm



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Treasure Coast R/C Club, Palm City, Florida 34990; Doug Goethel, 772-283-2260; email: tringo@gate.net



West Coast R/C Club, Lutz, Florida 33549; J.R. Sanyet, President, 813-991-0168



GEORGIA

Augusta R/C Racer's Club, Augusta, Georgia 30909; Darren, 706-860-5608; web: Augusta.rc.freehomepage.com



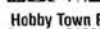
KEY TO SYMBOLS

- | | |
|-----------|--------------------|
| Indoor | Concrete |
| Outdoor | Asphalt |
| Off-road | Minis & Micros |
| On-road | On-site hobby shop |
| Oval | AC power |
| Dirt oval | Auto lap counting |
| Carpet | Food available |

Dalton Motorsports, Dalton, Georgia 30721; Keith Manton, 706-226-6699; email: dmso@dalton.net



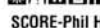
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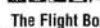
Hobby Town Raceway, Columbus, Georgia 31909; Frank Bastos, (706) 660-1793; email: fbastos@mindspring.com; web: www.hobbytown.com



Primetime Raceway, Calhoun, Georgia 30701; Tommy Jackson, 706-625-9037; email: primetimehobby@gccinternet.net; web: primetimehobby@gccinternet.net



SCORE-Phil Hurd Raceway, Savannah, Georgia 31406; Pat Rossiter, Club President, 912-920-2668; email: rosspeed@msn.com; web: www.score-racing.org



The Flight Box Hobby Shop, Rome, Georgia 30161-6826; Leslie Duke, (706)-234-3014



GUAM

Guahan Off-Road Racers Mangilao, Dededo, Guam 96929; Mr. Yoshimura, 671-637-8682; email: thumbtack2@yahoo.com; web: guaharacers.net/firms.com/

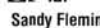


HAWAII

A.S.I. Racing, Kapaa, Kauai, Hawaii 96746; Arnold Morales, 808-821-8132



Radio Control Assoc./Alaa Park Raceway, Pearl City, Hawaii 96782; Ace R/C Products, (808) 456-1279



Sandy Flemings, Pearl City, Hawaii 96782; Dave Caldwell, 808-456-7272; email: info@formula1-rc.com; web: www.formula1-rc.com



IDAHO

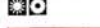
Almosta Ranch R.C.s, Twin Falls, Idaho 83301; Casey Clements, (208) 733-8667; email: james-casey-clements@hotmail.com



Capital Dirtburners, Boise, Idaho 83702; Joe Thompson, 208-466-6334; email: internarchitect@yahoo.com; web: communities.msn.com/capitaldirtburners



DM Raceway, Pocatello, Idaho 83201; Mike Buffaloe, 208-233-8163; email: mike@dmraceway.com; web: www.dmraceway.com



ILLINOIS

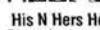
AJs Raceway & Hobby, Dekalb, Illinois 60115; AJ, 815-756-2772; web: www.ajsraceway.com



C&R Hobbies, Millford, Illinois 60953; Ray Craighead, 815-889-4073; email: thomas@millnet.net



C.I.R.C.A., Jacksonville, Illinois 62650; Randy Tendick - Sport-N-Hobby, (217) 245-1375; web: http://home.mchsi.com/~circa



His N Hers Hobbies Raceway, Bloomington, Illinois 61701; Kevin Turek, 309-827-0204; email: hisnher-shobbies@aol.com; web: www.hisnherhobbies.com



HobbyTown USA, Oak Park, Illinois 60301; Mark or Fred, (708) 445-8056; email: htupil@aol.com



Machesney Park Raceway, Machesney Park, Illinois 61115; Gina, (815) 282-1311; email: mpr30@aol.com; web: www.mpr30.homestead.com



Money R/C Raceway, Money, Illinois 60449; Roy or Roberta Moody, (708) 534-2422 (track), (708) 799-5597 (office)



Primetime Hobbies, Tremont, Illinois 61568; Don Davis, 309-925-9999; email: staff@primetimehobbies.com; web: www.primetimehobbies.com



Radio-Active Raceway, Bolingbrook, Illinois 60440; Jim, (630) 759-7557; email: RCVolter@aol.com



Venture Raceways, Libertyville, Illinois 60048, (847) 549-6963



INDIANA

Bremen Racing Ent., Bremen, Indiana 46506; Dale Heuberger, 219-546-3807



Duneland Hobbies & Raceway, Portage, Indiana 46368; Ron, 219-763-1610; email: RTrobaugh1@email.msn.com; web: www.dunelandhobbies.com



Hobby Barn Raceway, Terre Haute, Indiana 47802-9694, (812) 299-5773



P&T Hobbies and Raceway, Mitchell, Indiana 47446; Paul Weber or Tom Logsdon, (812) 849-6666; email: pthobby@quest.net; web: www.pthobby.com



Pete Russell's R/C Speedway, Elkhart, Indiana 46516; Pete Russell, 574-293-1827



R/C World of Indiana, Lynn, Indiana 47355; Joe Kolp, (765) 874-2464; email: rcworld@rcworld.com; web: www.rcworld.com



RC Barn, Monroe, Indiana 46772; Mark Lengerich, (219) 692-6600; email: bigdaddy@adamsells.com; web: www.rcbarn.com



RCRCR Raceway, Boonville, Indiana 47601; Scott Payton, 812-477-9661; email: spdracer@speedex.net; web: www.rcrcr.com



Schoolyard RC Speedway, Lagrange, Indiana 46761; David W. Bryan, 260-463-3558; email: dwbryan@loc.net; web: www.rcspeedway.net



Showtime Lot Racing, Fort Wayne, Indiana 46819; Mike Romines, (219) 478-6099; web: fortwaynecrpark.tripod.com/



IOWA

Ames Radio Control Speed Assoc., Ames, Iowa 50014; Ryan Davis/Brad Sandrett, 515-231-3813/515-432-0467; email: Davismotors@aol.com



Dubuque R/C Speedway, Dubuque, Iowa 52002; Craig Schmal, 563-587-0218; email: rccraig7@aol.com; web: www.geocities.com/dbarc



Hobby Haven, Des Moines, Iowa 50322; Rick Marble, (515) 276-8785; web: www.hobbyhaven.com



Independence, Independence, Iowa 50644; Eugene Bachman, 319-266-3857; email: BachmanE2@hotmail.com



Iowa City R/C Racing Association, Iowa City, Iowa 52240; Hobby Corner, (319) 338-1788



IROAR-Vinton Raceway @ Vinton Roller Rink, Cedar Rapids, Iowa 52402; Ed Karr, 319-362-1291; email: boxkarhobby@aol.com



Manly R/C Club, Manly, Iowa 50456; Bruce Hill, (641) 454-2025



Marble's Raceway, Des Moines, Iowa 50317; Rick Marble, (515) 262-7507



Radio Control Raceway Park, Fort Dodge, Iowa 50501; Bernie Halverson, 515-576-3780 (515-571-1717 Race Day); email: bhalverson@dodgenet.com



RiverFront Speedway, Fort Dodge, Iowa 50501; Bernie Halverson, 515-576-3780 (515-571-1717 Race Day); email: bhalverson@dodgenet.com



Wild Bill's Raceway, Knoxville, Iowa 50138; William Anderson, Jr., 641-842-5973; email: wildbilz@iowatelecom.net; web: www.wildbillsracing.com



KANSAS

D&B Raceway, Menlo, Kansas; Ron Ball, (785) 855-2370



KENTUCKY

Coyote Raceway, Lexington, Kentucky 40505; Steve M., 859-253-9330; email: coyoterace1@hotmail.com; web: www.coyoteraceway.com



Dixon's R/C RaceWay, Hazard, Kentucky 41701; Jeff Dixon, (606) 436-4820; email: jeffd1@hotmail.com



Mayking R/C Speedway, Mayking, Kentucky 41837; Jon Fields, 606-633-4700; email: jon1@se-tel.com



Pit Stop Hobbies, Paducah, Kentucky 42003; Robert or Rodney, 270-443-0052; email: pitstop1@apex.net



R.C. WOW, Falmouth, Kentucky 41040; John F. Jones, (859) 654-1700; email: rcwow@fuse.net; web: www.rcwow.com



Trio Hobbies & R/C, Radcliff, Kentucky 40160; Maurice Johnson, (502) 351-7547



Wildcat Speedway, Nicholasville, Kentucky; David Bowles, 859-272-0231



LOUISIANA

Fast Pace Hobbies, Alexandria, Louisiana 71301; Joseph or Casey Toralba, 318-561-2070; email: fastpacehobbies@aol.com



Gator R/C Raceway, Moss Bluff, Louisiana 70612; Tony Diaz, 337-855-3206; email: keithsjac@aol.com; web: homepage.mac.com/kmaples/



Hwy. 44 Hobby Shop, Gonzales, Louisiana 70737; Eric Olmstead, (225) 644-1773; email: eric209@aol.com



Red Stick R/C Raceway, Baton Rouge, Louisiana 70814; Michael Pino, 225-118-1002; email: redstick-raceway@aol.com; web: www.redstick-raceway.com



St. Charles RC Speedway, Destrehan, Louisiana 70047; Al Cazalot, (504)764-0625; email: stcharlesracer@home.com; web: members.home.net/stcharlesracer



MAINE

Central Maine R/C Speedway & Hobbies, Fairfield, Maine 04963; David Prescott, (207) 453-4588; email: rcracer@mint.net



Clay Bowl R/C Hobbies, Greene, Maine 04236; Pat Cap, (207) 946-5003



MARYLAND

Coles Race Way, Waldorf, Maryland 20602; Cole Brincefield, (301)-843-1386; email: kbrincefield@cs.com



GPA Hobbies, Crofton, Maryland 21114, 301-858-0004



HobbyTown USA, Glen Burnie, Maryland 21061; David Parkison, 410-590-4950; email: racing@mdhobbytown.com; web: mdhobbytown.com



The Track, Gaithersburg, Maryland 20877; Mimi Wong, (301) 417-9630; email: mimithetrack@yahoo.com; web: www.rctrack.com



MASSACHUSETTS

Big Boys Toys, Fall River, Massachusetts 02723; Track Owner, 508-677-9400



East Templeton Model Raceway, Templeton, Massachusetts 01468; Keith Anderson, 1-978-632-1619; email: keith@glowplug.com; web: glowplug.com



Hi-Tech Hobbies, Raynham, Massachusetts; Ruben, (508) 880-5373



Megadrome Raceway, North Adams, Massachusetts 01247; Bob Blanchette, 413-743-7223



Northboro Speedway, Northboro, Massachusetts 01532; Bob Trimble, 508-393-8087 or 393-2691



R/C Excitement, Inc., Worcester, Massachusetts 01605; Todd Anderson, 508-753-8676; email: rcexcitement@aol.com; web: www.rcexcitement.com



RPM RC Raceway, Abington, Massachusetts 02351-1094; Richard Tonetti, (781) 857-2300; email: hobtown@AOL.com; web: www.rpmhobbys.com



MICHIGAN

D.R. R/C, Taylor, Michigan 48180; Bobby or Fred, (734) 287-7405; web: www.downracing.8k.com



Dirt Burner Racing, Commerce, Michigan 48390; Bill, 248-926-1140; web: www.dirtburnerracing.com



E.U.P., Kincheloe, Michigan 49788; Joel Wiggins, 906-495-3503



Fastraxx, Brownstown, Michigan 48173; Greg Yingling, (734) 379-8980; email: fast3@hotmail.com



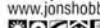
Great Lakes Racers Club, Grand Rapids, Michigan 49588; John Warner, 616-838-2231; email: GrLksRacers@aol.com; web: www.rogers.3.com/girc/



Hideaway Raceway, Napoleon, Michigan 49201; David Carlisle, 1-517-536-8821; email: adcarlisle1@netscape.net



Jons Hobby, Mt. Pleasant, Michigan 48858; Jon Beutler, (517)773-5412; email: jonshobby@earthlink.net; web: www.jonshobby.com



JT Superspeedway, Battle Creek, Michigan 49015; Jerry or Sam, 616-965-0116



Larry's Performance RC Carpet Track, Sterling Heights, Michigan 48314; Larry, 586-997-4840; email: lprcs@qwest.net



Lazer RC Speedway, Adrian, Michigan 49221; Russ Johnson, (517) 263-2806



N.M.R.C.C. Speedway, Gaylord, Michigan 49735; Gabe, (989) 732-3963; email: hobby-loy@voyager.net



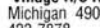
R&L Hobbies & Racing, Portage, Michigan 49002; Rex Simpson, (616) 323-3686; web: www.rlhobbies.com



R.A.C.E. Inc., Jackson, Michigan 49203; Sam Sprang, (517) 787-9161



Raw Roots Race Tracks, West Olive, Michigan 49460; Roy Bennink, (616) 399-9338



Village Hobbies, Hesperia, Michigan 49421; John Fosdick, 231-854-1374; email: vhracing@triton.net

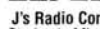


Village R/C Raceway, Decatur, Michigan 49045; Chuck Nolke, (616) 423-7878

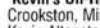


MINNESOTA

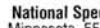
Country R/C Raceway Park, Belview, Minnesota 56214-8115; Charles L. Steffi, 507-641-8115



J's Radio Control Race Park, Starbuck, Minnesota 56381; Jay Campbell, (320) 239-4827



Kevin's Off-Road Raceway, Crookston, Minnesota 56716-2317; Kevin Altepeter, (218) 281-7523; email: kevin@krcrproducts.com; web: www.krcrproducts.com



National Speedway, Fridley, Minnesota 55432; Steve Hedenland, 763-571-9283; email: mrtip@national-hobby.com; web: www.nationalhobby.com



Northwoods Hobby Raceway, Brainerd, Minnesota 56401; John or Doug, (218) 829-9257



Twin Cities Hobby & Raceway, Brooklyn Park, Minnesota 55443;

Hobbies In Motion Raceway, Springfield, Missouri 65803; Mark Hroning, 417-886-9621; email: morkid-turismo@aol.com; web: www.gor-c.com

North Missouri Raceway, Chillicothe, Missouri 64601; Billy Johnston, (660) 646-1120

Novelty R/C Raceway & Hobbies, Novelty, Missouri 63460; Rex & Jena Franke, 660-739-4530; email: rex_jena@noveltyrc.com; web: www.noveltyrc.com

Ozarks R/C Raceway, Springfield, Missouri 65803; Gene Rhodes, 417-873-9350 (Track); 417-742-4376 (Home); email: OzarksRaceway@aol.com

RCTRAX Racing Club of Central Missouri, Hallsville, Missouri 65255; Gary Phillippe, 573-442-8183; email: philipp74@verizon.net

Real Blue Vue R/C, Kansas City, Missouri 64133; Steve Hale, (816) 358-0238; email: hrealrc@aol.com; web: www.geocities.com/real_rc_raceway

Real R/C Raceway, Pleasant Hill, Missouri 64080; Steve Hale, (816) 540-5584; email: hrealrc@aol.com; web: www.real-rc.com

Showtime Speedway, Bakersfield, Missouri; Don Risner, (601) 203-1481

MONTANA

Garden City R/C Speedway, Missoula, Montana 59801; Brian Culp, (406) 549-7992; email: gardencityrc@msn.com

Magic City Racers, Billings, Montana 59102; Bryan Grummett, 406-656-8266; email: jsaves@tgrsolution.net; web: www.magiccityrc.com

RC Offroad Association of Racing (ROAR), Libby, Montana 59923; Jamie, 406-293-6506; email: shark-boyet@hotmail.com

NEBRASKA

Hadar R/C Raceway, Norfolk, Nebraska 68701; John Schoenauer, (402) 644-7922

Hobby Town Raceway, Lincoln, Nebraska 68505; Chris or Chad, 402-434-5056; email: eaststore@aol.com

Hobby Town USA Raceway Park, Lincoln, Nebraska 68508; Chad or Chris, 402-434-5056; email: east-store@aol.com

NESCAR Raceway, Grand Island, Nebraska 68801; Steve Blayney, 308-382-0920; email: spinkgi@nebi.com

O.N.R.O.A.D., Omaha, Nebraska 68104; CoRK Jacobs, (402) 556-8674

OTWG Carpet Raceway, Norfolk, Nebraska 68701; John Schoenauer, (402) 644-7922

The Salvation Army Speedway, Omaha, Nebraska 68164, 402-734-3414

NEVADA

Dansey's Indoor R/C & Hobbies, Las Vegas, Nevada; David Lugo, (702) 453-365-1396; email: www.danseys.com

Las Vegas R/C Raceway, Las Vegas, Nevada 89139; Patrick Quinn, 702-365-1396; email: patrickquinn98@vcm.com; web: www.lasvegascrcraceway.com

T-Rix bikes & R-C shop, Elko, Nevada 89801; Gary Perkins, (775) 777-8804; email: mtman14k@hotmail.com

NEW HAMPSHIRE

Hill Top R/C, Troy, New Hampshire 03465; Pete Bastoni/Jim MacPherson, 603-242-3222; email: hilltoprc@netze-ro.net; web: www.hilltoprc.com

Lakes Region R/C Speedway, Gilford, New Hampshire 03246; Louie Blais, 603-524-2909; email: racing@lakesre-gionrc.com; web: www.lakesregionrc.com

RT 106 Racepark, Pembroke, New Hampshire 03275; David Daniels, 603-224-7223; email: david@collectracing.com; web: www.106racepark.com

NEW JERSEY

America's Hobby Center Inc., North Bergen, New Jersey 07047; John Many, (201) 662-0777; web: www.ahc1931.com

Back Track Raceway, Hammonton, New Jersey 08037; Bob W., 609-214-5016

Checkerboard Raceways, Elwood, New Jersey 08217; Ray Murray, 856-629-9413; email: RaysTrack@webtv.net

Family Hobbies Raceway, Vineland, New Jersey 08360; Linda Vogel, 856-696-5790; email: familyhobbies@yahoo.com; web: fami-lyhobbiesraceway.com

Jackson RC Club, Jackson, New Jersey 08527; Al Sardano, 732-364-6422; email: Tazzyd@optonline.net; web: www.jacksonrcracino.com

Jefferson Speedway, Oak Ridge, New Jersey 07438; Jim, (973) 697-7525

Millville R/C Oval & Roadcourse, Millville, New Jersey 08332; William Denstoz, 856-327-4640

On Trax Hobbies, Browns Mills, New Jersey 08015; Joseph DiGirolamo, (609) 735-0422

PottBellys R/C Speedway, Pitts Grove, New Jersey 08360; Drew Anastasio, 856-207-2495; email: pottbelly@pot-tbellysrc.com; web: www.pottbellysrc.com

South Jersey Cost Controlled Racing, Sicklerville, New Jersey 08081; Ray Murray, 856-629-9413; email: RaysTrack@webtv.net; web: www.sjccr.com

SpeedPro Dragway, Elizabeth, New Jersey 07206; Albie Nizolek, 908-351-5080; email: funnycar176@aol.com; web: www.speedpro.org

The Race Place, Farmingdale, New Jersey 07731; John Fary, (908) 938-5215

Wacky RC Raceway, Roselle, New Jersey 07203; Tony Williams or Kimble Wright, (908) 241-6700

NEW MEXICO

Albuquerque R/C Off-Road Raceway, Albuquerque, New Mexico 87120; Bill Mitchell, (505) 250-3411(m); (505) 898-6181(h); email: info@rcDirTrack.com; web: www.rcDirTrack.com

Speed Zone, Clovis, New Mexico 88101; Brad Ferguson, 505-769-1737; email: speedzone@yucca.net

NEW YORK

BarnStormers R/C Raceways, Chester, New York 10918; Lou Sysma, 845-469-BARN(2276) or 469-6468; email: iamsysma@hotmail.com; web: www.barnstormersrc.com

Brennan's RC Hobbies, Vernon, New York; Bill or Tom Brennan, (315) 829-4930

Brooklyn Hobbies, Brooklyn, New York 11234; Chris Palermo, 718-951-2500; email: brooklynhobbies@aol.com; web: www.brooklynhobbies.com

Bruckner Racing, Bronx, New York 10465; Thomas Baffers Sr., (800)-288-8185

Capital District Radio Controlled Stock Car Club, Rensselaer, New York 12144; Eric Conrard, 315-482-7128; email: cdrcsc@hotmail.com; web: www.cdrcracers.50megs.com

Chipmunk Hill R/C Speedway, Theresa, New York 13691; Ted or Pete House, (315) 628-5065

Competition Hobby Supplies & Speedway, Cohoes, New York 12047; Howie Cummings, 518-786-3622; email: howard.cummings@verizon.net; web: www.competitionhobbysupplies.com

East Coast R/C Hobbies, Brooklyn, New York 11417; John Giangrande, 718-627-3814

Fastraks, Hogsburg, New York 13655; Mark Castonguay, (518) 358-3686; email: froghobb@northnet.org; web: www.fastraks.8m.com

Hobby Zone Raceway, Ozone Park, New York 11417; Brian, Sean or Adam, (718) 641-9001; email: moon-chaserwolf@aol.com

Millville R/C Oval & Roadcourse, Millville, New Jersey 08332; William Denstoz, 856-327-4640

Lil Wheels Raceway, Oswego, New York 13126; Bill Meyer, 343-6566; email: lilwheelsraceway@hotmail.com; web: lilwheelsraceway.tsx.org

Long Island Raceway, Farmingdale, New York 11735; James, (516) 845-7223; web: www.raceway.com

PRO Speedway, Cattaraugus, New York 14719; Marc Pritchard, (716) 257-3101

Radio Hill Raceway, Dundee, New York 14837; Bill or Greg, 607-243-8641 (Bill); 607-243-7899 (Greg)

Rampage R/C & Hobbies, Hyde Park, New York 12538; Brian Walker, (845) 229-1379

South Shore Hobby & Raceway, Coram, New York 11727; Benny or Bonnie, 631-696-8500; email: sshob-by@northeast.net; web: www.southshorehobby.com

Southern Tier Raceway, Owego, New York 13827; Anita Harding, (607) 687-5395

TARMAC Ultimate R/C Raceways, Poughkeepsie, New York 12603; Todd Plasse, 845-342-5409 (Todd); 845-454-8276 (Track-Sundays); email: toddp@tarmacraceway.com; web: www.tarmacraceway.com

Walt's Hobby, Syracuse, New York 13209; Bruce, 315-453-2291; web: www.waltshobby.com

Willis Hobbies R/C Speedway, Mineola, New York 11501; Ken Ford, 516-746-3944; web: www.willishob-bies.com

NORTH CAROLINA

Antique Barn & Hobby Shop, Wilson, North Carolina 27893; Steve, (252) 237-6778; email: antiquebarn@esn.net

Chatham R/C Raceway, Bear Creek, North Carolina 27207; Dwight Fields, (919) 898-4518; email: chatham_rc_speedway@yahoo.com; web: www.chathamracespeedway.com

R.C.R. Speedway, Salisbury, North Carolina 28147; Ronnie Linker, (704) 637-2565

Race City Motor Speedway, Mooresville, North Carolina 28115; Ray Kelly, 704-660-FAST; email: Kellyrcms@cs.com; web: racecitymo-torspeedway.com

Rosewood RC Speedway, Goldsboro, North Carolina 27530; Glenn Elam, 919-734-7754; email: gelam49@hot-mail.com; web: www.glennhobby-corner.com

Sandhills Raceway, Southern Pines, North Carolina; Mike Russel, 910-245-4450; email: mrmrc@mindspring.com; web: www.sandhillsraceway.com

Southern R/C Motorsports Club, Shallotte, North Carolina 28459; Chris Dixon, (910) 754-6315; email: nohope@atmc.net

Xtreme Hobbies, Kannapolis, North Carolina 28083; Chris Lyerly, 704/933/5321; email: thehob-byshop02@aol.com

NORTH DAKOTA

Grand Forks Remote Control Racers, Grand Forks, North Dakota 58201; Dan Miller, 701-746-9910; email: dand-jmiller@juno.com; web: mule.puah.org/gfrcr

OHIO

AK Hobby & Raceway, Cincinnati, Ohio 45211; Tim Tolle, (513) 661-7080; email: tim@akhobby.com; web: www.akhobby.com

American Ohio Sprint Car, Wickliffe, Ohio 44092; Gary Waldheim, 440-944-9966; web: www.aosca.8m.com

Black Swamp RC Car Club, Toledo, Ohio 43623; Riders Hobbies, 419-843-2931; email: ridersrcclub@webtv.net; web: www.blackswampc.cjb.net

CORCAR/ Sams Club, Galloway, Ohio 43119-8732; Bill Stevenson, (614) 870-7159

D&J R/C Raceway, Orrville, Ohio 44667; Don, (330) 682-4266

DeFosse Raceway, Ripley, Ohio; Greg DeFosse, (937) 377-2063

Hobbyland Raceway, Proctorville, Ohio 45669; Craig Harber, 740-886-0502 or 740-8868062; email: pitrow-eracing@webtv.net; web: hobbyland-raceway.homestead.com

Mid Ohio Dirt Oval, Lexington, Ohio 44904; D&D Hobby Center, (419) 884-0001

Nothing But Air R.C. Track, Logan, Ohio 43138; Gary Lloyd, 740-385-0288

Ohio Valley OffRoad R/C Raceway, Jerusalem, Ohio 43747; Kevin Wilson, (740) 926-1738; email: consolo@tst.net; web: www.ovor.8m.com

Outlaw Speedway, Lexington, Ohio; Eric Radio, 419-884-0001; email: kramerj@atmc.com; web: rcdirtoval.freesevers.com

R/C Hobby, Medina, Ohio 44256; Larry Lutz, 330-732-0255; email: kohouty@aol.com

Raceway 42, Mansfield, Ohio 44905; Chris Cates, 419-589-4173; email: mopar340v8@aol.com; web: www.Raceway42.itgo.com

River Rat Racing, Ripley, Ohio 45167; Jon Faris, 937-392-9298; email: honey3@bright.net; web: www.riverratraceway (under construction)

T.S.R.C.A.R., Hamilton, Ohio 45011; Dennis Young, (513) 367-5634; email: scalercar@aol.com; web: www.tri-starterautoracers.com

TARCAR, Toledo, Ohio 43617; Bill Bridges, (419) 826-3859

Ultra Racing R/C Hobby and Track, Hamilton, Ohio 45015; Ed Lewis, 513-863-7342; email: UltraRacing@aol.com; web: www.rccaronline.com

Van Wert R/C Raceway, Van Wert, Ohio 45891; Mark Davis, (419) 232-2112

Y-City Hobby & Speedway, Zanesville, Ohio 43701; Kevin McKenna, (740) 455-3025; email: Kevin@y-city-hobby.com; web: www.ycityhobby.com

OKLAHOMA

Action Hobbies, Tulsa, Oklahoma 74145; David Cole, (918) 663-8998; email: acthobii@aol.com

KEY TO SYMBOLS

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|--|-----------|--|--------------------|
| | Indoor | | Concrete |
| | Outdoor | | Asphalt |
| | Off-road | | Minis & Micros |
| | On-road | | On-site hobby shop |
| | Oval | | AC power |
| | Dirt oval | | Auto lap counting |
| | Carpet | | Food available |

Action RC Speedway, Oklahoma City, Oklahoma 73135; Jerry Hawthorne, (405) 670-7770; email: ginna@flash.net; web: www.actionrc.com



Adams Creek R/C Speedway, Broken Arrow, Oklahoma 74014; John Beighle, (918) 355-1416



Competition R/C, Oklahoma City, Oklahoma 73149; James or Louise Brown, (405) 634-0809; email: com-prc1@aol.com



Enid R/C Speedway, Enid, Oklahoma 73703; Darin Pendleton, (580) 554-9400; email: darin@enid.com; web: www.enidrcracing.com



HobbyTown USA, Norman, Oklahoma 73072; Todd Jensen, (405) 292-5850



Wings N Things Raceway, Tulsa, Oklahoma 74105; Heath Anderson, (918) 745-0007



OREGON

Competition Racing Association, Portland, Oregon 97230; Mark Taylor, Pres., 503-761-1334; 503-761-0443fax; email: mark@cra-news.com; web: cra-news.com



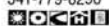
Dirt City RC, Albany, Oregon 97321; Doug Vertrees, (541) 791-1089; email: quicktemprrc@aol.com



R/C Plus Hobbies Raceway, Salem, Oregon 97302; Ron Smith, (503) 364-9188; email: rcplus@rcplus.com; web: www.rcplus.com



R/C Speed Center, Medford, Oregon 97501; Gene & Betty Jean Skelton, 541-779-8298



Rose City Scale Racing, Milwaukie, Oregon 97222; Rick Strauss, (503) 631-2929; web: www.rc-cars.com



PENNSYLVANIA

Bumps & Jumps RC Speedway, Middletown, Pennsylvania 17057; Chris McKinney, 717-728-4613; email: chrismc@bigfoot.com; web: www.bumpsandjumps.com



Courtview Raceway, Washington, Pennsylvania 15301; Aaron Stimmell Jr., 724-228-8396



DC Ultra Trax, Warminster, Pennsylvania 18974; David Cowan, (215) 672-5200; web: www.jcrchobbies.com



Dreamboat Hobbies, Warren, Pennsylvania 16365; Louie Dussia, (814) 723-8052; email: dreamboat77@yahoo.com



J&K Hobbies and Raceway, Jersey Shore, Pennsylvania 17740; Jason Corter or Kevin Casbeer, 570-398-8171; email: rcmaniac01@msn.com



Kranzel's R/C Raceway & Hobbies, Lemoyne, Pennsylvania 17043; David or Stuart Kranzel, (717) 737-7223; web: www.kranzelsrchoobbies.com



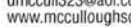
Little Plum R/C Hobbies, Lock Haven, Pennsylvania 17745; Larry Duck, (570) 769-1984



Marshall's R/C Raceway, Honesdale, Pennsylvania 18431; Bill or Dot Marshall, (570) 729-7458



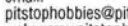
McCullough's Offroad, Sarver, Pennsylvania 16055; Doug McCullough, (724) 352-0116; email: dmccul323@aol.com; web: www.mcculloughsoffroad.com



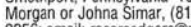
Newville RC Speedway & Hobbies, Newville, Pennsylvania 17241; Randy or Mike, 717-776-5568; email: newvillerspeedway@yahoo.com; web: www.newvillerspeedway.com



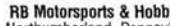
Pit Stop Hobbies, Mount Joy, Pennsylvania 17552, (717) 653-6222; email: pitstophobbies@pitstophobbies.net; web: www.pitstophobbies.net



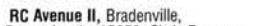
Racers Edge R/C Racing & Hobbies, Smethport, Pennsylvania 16749; Rick Morgan or Johna Simar, (814) 887-9256; email: racersedge@mind-spring.com; web: www.racersedge.com



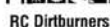
RB Motorsports & Hobby, Northumberland, Pennsylvania 17857; Rick Bunting, (570) 473-8711



RC Avenue II, Bradenville, Pennsylvania 15650; Chris Demyan, 724-537-9592; email: 12ss@msn.com



RC Dirtburners Club, Windber, Pennsylvania 15963; Bruce Schmidt, (814) 266-4118; email: rckid1@cs.com



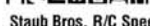
RC Outfitters, Hanover, Pennsylvania 17331; Chris Shaffer, (717) 633-9490; email: thestore@rchoobbies.com; web: www.rchoobbies.com



Riverside Raceway, Warren, Pennsylvania 16365; Jeff, (814) 723-4211



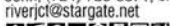
Staub Bros. R/C Speedway, Gettysburg, Pennsylvania 17325; Todd or Scott Staub, 717-334-8488; web: www.staubbrothers.com



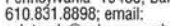
The Raceway at River Junction, Beaver, Pennsylvania 15009; Sam or John, (724) 728-5551; email: riverjct@stargate.net



Thunder Road Raceway, Limerick, Pennsylvania 19468; Barry or John, 610.831.8898; email: xslotgdx@aol.com; web: www.tow-barr.com



Track 84, Narran, Pennsylvania 17555; Andrew Flexer, (717) 354-6503



Trains & Lanes Raceway, Easton, Pennsylvania 18045; Jeff Setzer, (610) 253-8850 or (800) 447-4891; email: trainlanes@aol.com



TRP, Kingston, Pennsylvania 18704; Rob Yeager, 570-283-3066; email: rrobb99@aol.com

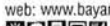


WillCam Raceway, Punxsutawney, Pennsylvania 15767; James Campbell, (814) 939-4251

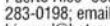


PUERTO RICO

Bayamon R/C Park, Bayamon, Puerto Rico 00956; Damian Cruz & Javier Rivera, (787) 869-8092 & 401-2770; email: damian@bayamonrcpark.com; web: www.bayamonrcpark.com



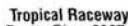
Hi-Speed C Raceways, San Juan, Puerto Rico 00926; Carlos Ortiz, (787) 283-0198; email: hispeed@hotmail.com; web: www.hispeedhobby.com



Mech Tech Touring Park, Caguas, Puerto Rico 00725; Humbert (Tito) Lizardi, (787) 739-1572; email: tlizardi@hotmail.com



Tropical Raceway Track, Manati, Puerto Rico 00674; Hector Pabon/George Pabon, 787-785-9529; email: trophob@coqui.net; web: www.tropicalhobby.com



RHODE ISLAND

Insane Track, Cranston, Rhode Island 02907; Jose Jimenez, 401-467-8878; email: chevygo8@aol.com; web: www.insanehobbies.homestead.com



SK Hobbies Inc., Johnston, Rhode Island 02919; Slim or Keith, (401) 453-1440

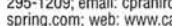


SOUTH CAROLINA

Atomic Racers, Aiken, South Carolina 29803; Bill Jackson, 706-855-0846 or 803-725-1664



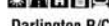
Carolina R/C Speedway, Easley, South Carolina 29640; David, 864-295-1209; email: cprahlrc@mind-spring.com; web: www.carolinarc.com



D&S Hobbies R/C Track, Hartsville, South Carolina 29550; Don Dietz, 843-383-0017; email: dshobbydon@aol.com; web: www.dshobbies.com



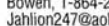
Darlington R/C Raceway at Hobbies & More, Darlington, South Carolina 29532; Jerry Pollard, (843) 393-0355; web: www.hobbiesnmore.com



Hi Voltage Raceway, Anderson, South Carolina 29625; Whitner Bowen, 1-864-225-8680; email: Jahlion247@aol.com



The Grove Racing Center, Rockhill, South Carolina 29730; Don Faris, (803) 327-4121; web: www.hobbystop.com

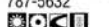


SOUTH DAKOTA

Dakota Off-Road Racers, Aberdeen, South Dakota 57401; Kevin, 605-225-5223



Grassland Racers, Black Hawk, South Dakota 57718; Ryan Logan, (605) 787-5632



Triple B, Winner, South Dakota 57580; Broc Stout, (605) 842-2699

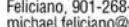


TENNESSEE

Hobby Town USA, Franklin, Tennessee 37067; Bobby Mills, (615) 771-7441; email: htut126@aol.com



Mid-South Racing Association, Memphis, Tennessee 38133; Michael Feliciano, 901-268-7969; email: michael.feliciano@expeditors.com; web: www.msra-racing.com



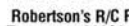
MSA R/C Racing, Crossville, Tennessee 38555; D.R. Findley, (931) 456-0027



Need For Speed Raceway R/C, Chattanooga, Tennessee 37415; Ronnie Cox, (423) 876-9019



Robertson's R/C Raceway, Jackson, Tennessee 38301; Travis Robertson, 731-423-6984; email: RobertsonsRC@aol.com



SpeedZone Raceway & R/C Hobbies, Sweetwater, Tennessee 37874; Mike Henderson, 423-351-0055; email: speedzon@msn.com; web: www.speedzonraceway.com



Stalerville Village Raceway, Ducktown, Tennessee 37326; Len James, 423-496-5006; email: stalerville@elljay.com



W.O.W. Raceway, Beech Bluff, Tennessee 38313; Brad Jones, 731-427-1625; email: wowracer@hotmail.com; web: go.to/wowracing



TEXAS

215 Speedway, Abilene, Texas 79602; Clyde Gardner, (915) 673-2351



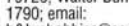
Al's Hobbies, San Antonio, Texas 78227; Alfonso Robles, 210-645-1050; email: alshobbies@usa.com; web: www.alshobbiesusa.com



Austex RC, Austin, Texas 78757; Michael, 512-458-2324; web: www.austexrc.com



B&B R/C Hobbies, Big Spring, Texas 79720; Walter Bumbulis, (915) 263-1790; email: b&brchobbies@apex2000.net



Big Mike's R/C Raceway, Longview, Texas 75604; Mike Sumrow, 903-297-7814



Drycreek Raceway, Greenville, Texas 75402; Micky Alphin, 903-527-5381; web: web.pulse.net/drycreek



Finishline Raceway, Hurst, Texas 76053; Damon Darnall, (972) 404-0463; email: Finishline@ev1.net; web: http://users.ev1.net/~finishline/index.htm



Hal's Hobby Raceway, El Paso, Texas 79936; (915) 591-2213; web: www.halshobbywarehouse.com



Hobby Center Race Track, Houston, Texas 77598; Issac Ben-Ezra, 281-488-8697; email: Hobbycenter@issac-smodels.com; web: www.hobbycenter.cc



Hobbytown USA, San Antonio, Texas 78209; Clark, (210) 829-8697; fax: (210) 829-8707



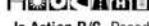
Indy R/C World, Garland, Texas 75041; Steve Webster, (972) 271-4844; fax: (972) 271-4502; web: www.indyrcworld.net



Js Action R/C, Pasadena, Texas 77504; Jack Williams, 713-946-8888; email: jayactionrc.net; web: www.jsactionrc.com



K&M Racing, New Caney, Texas 77357; Brent Mahaffy, (281) 399-9777



M&M Hobby Center, Bellaire, Texas 77401; Meir Ben-Ezra, 713-661-7137; email: mandm@mnmhobby.com; web: www.mnmhobby.com



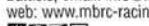
MBRC, Dallas, Texas 75093; Mike Battelle; email: info@mbrc-racing.com; web: www.mbrc-racing.com



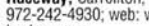
Mike's Hobby Shop Superstore & Raceway, Carrollton, Texas 75006; 972-242-4930; web: www.mikeshobbyshop.com



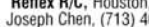
Reflex R/C, Houston, Texas 77055; Joseph Chen, (713) 464-4458; web: www.reflexrc.com



T&M Raceway R/C Drag Racing, Addison, Texas 75244; Marvin Jackson, (972) 416-0445; email: mjackson@tmraceway.com; web: www.tmraceway.com



T&T R/C Cars, Plano, Texas 75024; Joe Sullivan, (972) 633-2470



The Rollcage, Greenville, Texas 75402; Guy Allen, (903) 883-0332; email: rollcage2000@therollcage.com; web: www.therollcage.com



Thompsons RC Raceway, Lufkin, Texas 75901; Mark Thompson, (936) 637-0093



W.E.S. Hobby Race, Beaumont, Texas 77701; Marty Walker, (409) 839-4929



X-Treme Hobbies, Round Rock, Texas 78664; Jef Santos, (512) 310-0444 or (512) 388-3819



UTAH

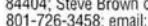
Hobbie Stop Raceway, Riverdale, Utah; Todd Hamilton or Beazer Martin, (801) 622-0841



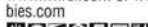
Intermountain R/C Raceway, Magna, Utah 84044; David Mott, 801-250-8303; email: rcmother1@aol.com; web: members.aol.com/rcmother1



Outback Raceway, Ogden, Utah 84404; Steve Brown or Beazer Martin, 801-726-3458; email: Steve@rmrcr.com or Beazer@bibbs.com; web: www.rmrcr.com or www.beazershobbies.com

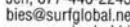


Vision Hobby, Orem, Utah 84057; Ken Rice, (801) 226-6226

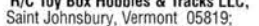


VERMONT

Empire Hobbies Off-Road Raceway, Saint Albans, Vermont 05478; Scott or Jen, 877-446-2243; email: empirehobbies@surglobal.net; web: www.empire-hobbies.com

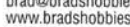


R/C Toy Box Hobbies & Tracks LLC, Saint Johnsbury, Vermont 05819; Raymond Richard, 802-748-1030; email: ray@rctoybox.com; web: www.rctoybox.com

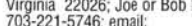


VIRGINIA

Brad's Hobbies, Staunton, Virginia 24401; Brad, (540) 885-3642; email: brad@bradshobbies.com; web: www.bradshobbies.com



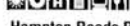
Brown Brothers Hobbies, Dumfries, Virginia 22026; Joe or Bob Brown, 703-221-5746; email: joe@bbhobbies.com; web: www.bbshobbies.com



DRCW Raceway, Virginia Beach, Virginia 23454; Les Modlin, 757-340-6681; web: www.debbiesrcworld.com



Hampton Roads R/C Drag Club, Virginia Beach, Virginia 23452; Garry Nelson, 757-399-8645; email: Garry@gsdragracing.com; web: www.HRRCDC.com



KC's Radio Control & Repair, Lynchburg,

Stream Hobby Shop, Newport News, Virginia 23605; Rusty Kennedy, 757-591-0720; email: streamrc@aol.com; web: streamhobbyshop.com



The Tiltyard, Dayton, Virginia 22821; Homer, 540-828-3476; email: homer@tiltyard.com; web: www.tilt-yard.com



Thunder Road RC Speedway, Gordonsville, Virginia 22947; Robert Bingle, 434-296-6549; email: tripod@thunderroadrc.com; web: www.thunderroadrc.com



Tidewater R/C Speedway, Inc., Hampton, Virginia 23663; Jim Pike, Rob Marsette, Dave Pritchard, (757) 723-8927; email: zeeya31@hotmail.com



WASHINGTON

A-Main Raceway, Vancouver, Washington 98685; Monty Coleman, (360) 571-8404; web: www.amainrace-way.com



Burien Toyota R/C, Seattle, Washington 98148; Ray Meek, (800) 654-6456



Cedardale Raceway, Mount Vernon, Washington 98273; Craig, 360-755-9464



Fantasy World Raceway, Tacoma, Washington 98408; Dave Kleinman, (253) 473-6223; email: sales@fantasy-worldhobbies.com; web: www.fantasy-worldhobbies.com



Four Season R/C Racing, Olympia, Washington 98506; Gary and Sharon Brown, (360) 491-2430



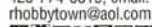
Hank Perry Raceway, Spokane, Washington 99023; Hal Hudson, 509-879-3503; email: halhudson@msn.com



HobbyTown USA, Tacoma, Washington 98408; HobbyTown USA Shop, (253) 474-7787



HobbyTown USA, Lynnwood, Washington 98037; Rich or Jamie, 425-774-0819; email: rhobbytown@aol.com



Paradise Raceway and Hobbies, Spokane, Washington 99207; Mark, 509-483-1843; email: paradiserc@hotmail.com; web: www.websellers.com/paradise



Race City, Auburn, Washington 98002; Bruce, (253) 939-2515; email: auburn@pacifier.com



Rain City R/C Raceway, Lynnwood, Washington 98036; Pete or Debbie Cartwright, 425-776-8241; email: info@raincityraceway.com; web: www.raincityraceway.com



Pro-Star Racing, Green Bay, Wisconsin 54301; Chuck or Randy, 920-494-1233; Randy-920-336-5503; web: www.prostartracing.com



Redmond Hobbies Raceway, Redmond, Washington 98052; Stan Ng, (425) 885-3639; email: info@redmondhobbies.com; web: redmondhobbies.com



Schmidt's Auto Parts, Marysville, Washington 98271; Jon Falla, (360) 653-8838; web: www.schmidtsracing-way.com



Spokane Indoor Raceway, Spokane, Washington 99212; Brian Batch, 509-487-2122



Tacoma R/C Raceway, Tacoma, Washington 98406; Scott Brown, (253) 565-1935; web: www.tacomarc-raceway.com



West Coast Hobby & Raceway, Richland, Washington 99352; Darren Shank, (509) 375-4995



WEST VIRGINIA

Burr Fab R.C. Raceway, West Union, West Virginia 26456; Mark Travis, 304-873-2487; email: burrhouse1@cs.com



Fulton's R/C Raceway, Wheeling, West Virginia 26003; James Fulton, (304) 233-5355



Mountwood Raceway, Vienna, West Virginia 26105; Tom Allen, 304-295-3234; email: ray@ovrcc.com; web: www.ovrcc.com



Quiet Dell Raceway, Fairmont, West Virginia 26554; Darris, (304) 366-1441; email: Tateracing@aol.com



WISCONSIN

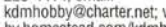
ABC R/C Inc & Raceway, Waukesha, Wisconsin 53186; Dick Mathiesen, 262-542-1245; email: Help@abcrchobby.com; web: www.abcrchobby.com



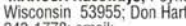
Gary's Hobby Center, Racine, Wisconsin 53403; Bill Phalen, 262-554-8884



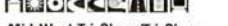
KDM Raceway, Abbottsford, Wisconsin 54405; Kevin Michlig, 715-223-4414; email: kdmhobby@charter.net; web: kdmhobby.homestead.com/kdmhobby.html



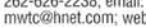
MARCCA Raceways, Poynette, Wisconsin 53955; Don Hartley, 608-243-1778; email: hotrodhartley@aol.com; web: www.marcca.com



Mid-West Tri-Clone/Tri-Clone OffRoad, West Bend, Wisconsin 53095; Dave Hilpert, 262-334-0429 or 262-626-2238; email: mwtrc@hnet.com; web: www.triclone.com



Pro-Star Racing, Green Bay, Wisconsin 54301; Chuck or Randy, 920-494-1233; Randy-920-336-5503; web: www.prostartracing.com



S&N's Trackside Hobbies and Raceway, Milwaukee, Wisconsin 53005; Scott Ernst, 262-783-4699; email: sernst@trackside.com; web: www.trackside.com



The Shortfall Raceway, Eau Claire, Wisconsin 54701; Scott Schoettle, 715-838-8350; email: Scottschoettle@mcleodusa.net



WYOMING

Xtreme Hobbies Raceway, Gillette, Wyoming 82718; Krieg Balls, 307-682-6077; email: xtreme@vcn.com

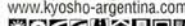


ARGENTINA

Circito R/C Lobos, Lobos, Buenos Aires 7240; Rupert Bruce, 54-02227-422905; email: rlobos@yahoo.com; web: www.rlobos.8m.com



Circuit M.R. Models, Buenos Aires 1428; Maximiliano Roballos, 54 11 4557 1000, fax 4780 1677; email: info@kyosho-argentina.com.ar; web: www.kyosho-argentina.com.ar



Club A. Velez Sarsfield, Buenos Aires; Jorge Herrero, 54-01-658-5851



AUSTRALIA

A.C.T. Model Car Racing Club, Wanniaassa, ACT; Gary Davey, 61-6-2871411



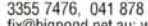
A.C.T. Remote Control Car Club, Kambah, ACT; Rob Jorgensen, 61-2-6231-9925; email: bjorgo@sr.gov.au; web: users.bigpond.net.au/grjactrcc.html



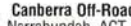
Aubry R/C Car Club, Aubry, New South Wales 2640; Ron Langman, 060-247-128



Brisbane Dirt Racing, Brisbane, Queensland 4053; Jeff Chandler, 07 3355 7476, 041 878 3201; email: bigfix@bigpond.net.au; web: www.users.bigpond.net.au/bigfix



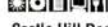
Canberra Off-Road Model Car Club, Narrabundah, ACT 2604; Graham Brown, 61-6-241-3070



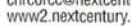
Carine R/C Model Car Club, Inc., Greenwood, Western Australia; Mitchell Davies, 0418 955 981; email: t3daviess@inet.net.au



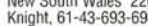
Castle Hill Radio Control Off Road Car Club, Castle Hill, New South Wales 2754; Peter Ellis, 0412 257 353; email: chrccrcc@nextcentury.com.au; web: www2.nextcentury.com.au/chrccrcc



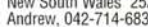
Central Coast ORRCC, Bateau Bay, New South Wales 2261; Peter J. Knight, 61-43-693-698



Illawarra RCECC, Albion Park Rail, New South Wales 2527; Mel or Andrew, 042-714-683



Lakeside R/C Racing Car Club, Lansvale, New South Wales 2166; R. Bartolozzi, 62-2-907-9800



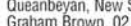
Melton Electric Circuit Car Association, Melton, VIC 3337; Arthur Joslin, 61-3-9747-8805



Monaro Radio Control Car Club, Queanbeyan, New South Wales 2902; Graham Brown, 02 6241 3070; email: gbrown@webone.com.au; web: www.webone.com.au/~gbrown/mrccc/index.html



NSW Indoor R/C Raceway, Hurstville, Sydney 2220; Anthony Lee or Walter Ly, 02-9585-8810



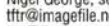
Penfield Park, Adelaide, South Australia 5108; Trevor UNew South Walesorth, (618) 8289-5010



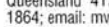
R.C. Speedway, Newcastle, New South Wales 2300; Andrew Dillon-Smith, 02-49265966



TFTF - Templestowe Flat Track Racers, Templestowe, Victoria 3106; Nigel George, see website; email: tftf@imagefile.net; web: drive.to/tftf



The Bayside Raceway, Brisbane, Queensland 4178; Nigel Bell, 07 3893 1864; email: mvr1@dingoblue.net.au



Victorian Radio Control Drag Racing Association, Melbourne, VIC 3940; John de Tracy, 03 59820459; email: bjrm1@hotmail.com; web: www.ozemail.com.au/~john59/index.html



Wee Waa's Offroad RC, Burren Junction, New South Wales 2386; Shane, 61-02-6796-1339



Wodonga R/C Car Club, Wodonga, VIC 3690; Paul Townsend, 02-6056-0706; email: townsend175@ozemail.com.au



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BARBADOS, WEST INDIES

R.O.A.R. (Radio Operated Auto Racing), St. Michael; Marva Clarke, (246) 427-3907



BELGIUM

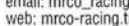
ATR-Alka-Tele-Racing, Limburg; Alken, 0032-11-25-49-03



MBV-Kampenhout, Kampenhout B1910; Frank Mostrey, 0-16-65-75-18



Model Racing Club Oudenaarde (MRCO), 9700 Oudenaarde; Nicky Delmote, and fax: 32 55 30 36 25; email: mrco_racing@hotmail.com; web: mrco-racing.tripod.com



MRCZ, De Burg; Montie, 75-71-63



R.C.R., Retie 2470; A. Eelen, 32-14-379685



BRAZIL

AGARC Associaçao Goiana de Automodelismo Radiocntrlado, Aparecida de Goiânia, GO 74980-070; Zeca, Carol, Warner or Rodrigo, 062 9979 9009; email: zeca.net@terra.com.br



Amoc Cassociaçao de Modelismo B. Camborio, Bal. Camboriu, South Carolina 88.330-000; Leo Cesar, (047) 366-0001



Brasilia R/C Model Circuit, Brasilia, DF 70000; Alexandre (Alex), 55-061-273-7205



C.A.A.R. Curitiba Associacao de Automodelismo Radiocntrlado, Curitiba, Puerto Rico 82650-530; Ronaldo Assumpcao, 55-41-354-2804



Electric Car Club R/C Santos, Santos, Sao Paulo 11065-001; Estevam or Arnaldo, 55-013-232-2536



Hobby Center, Brasilia, DF 70.273, 061-242-0488



Hobby Planet Racing Club, Campinas, Sao Paulo 13091901; Daniel, Hello, Luciano, 019 258 2768



Jungle Drive, Rio de Janeiro, PB 21940-490; Paulo Brito, (021) 396-0851 or (021) 393-7449

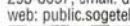


Off Roaders, Sao Paulo, CEP 05640; Waldir Ielpo, (055) 011-260-5628; fax (055) 011-831-4931

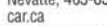


CANADA

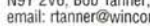
ATN, Saint-Jean -Baptiste-de-Nicolet, Quebec J3T 1E5; Louis Durand, (819) 293-6097; email: durand@sogetel.net; web: public.sogetel.net/ldurand/



C.A.R.C.A.-C.R., Calgary, Alberta; Kerry Nevatte, 403-630-8852; web: www.car-car.ca



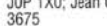
Cactus Speedway, Kingsville, Ontario N9Y 2V6; Bob Tanner, 519-326-3176; email: rtanner@wincom.net; web: www.sparcracers.com



Cam R/C, Coquitlam, British Columbia V3E 1K9; Roger Brown, 604-945-3888



Circuit J.C., St. Polycarpe, Quebec J0P 1X0; Jean Castellon, 450-265-3675



Circuit Teleguide ST Roch, ST Roch De L' Achigan, Quebec J0K 3H0; Gerald Beauchamp, 450-588-4254; email: gedoroam@colba.net; web: www.grcsr.com



Copetown Raceway, Copetown, Ontario; Adam Filipowicz; email: adamfilip@home.com; web: copetown-raceway.8k.com



Dynamic Hobbies, Nepean, Ontario K2E7S4; Fred Zuteft, (613) 225-9634



HobbyHobby P.L.R.C., Mississauga, Ontario L5M 1K8; Tom Bakonyi, 905-858-7978; email: info@hobbyhobby.com; web: www.hobbyhobby.com

Mini-Z Hobby Shop, Markham, Ontario L3R 0W4; Brian Pong, (905) 940-0898; email: info@minizhobbyshop.com; web: www.minizhobbyshop.com

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Prince George Radio Controlled Car Club, Prince George, British Columbia V2M 5R9; Doug Waller, 250-561-0035

R/C Champ Raceway, Scarborough, Ontario M1H 3A4; Ben, Matthew or Louie, (416) 289-8717; web: www.rcchamp.com

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R/C Fanatic, Charlesbourg, Quebec G1G 3Y4; Marc Page (Club President), 418-265-2678; email: info@rcfanatic.com; web: www.rcfanatic.com

ASIA

Recreation R/C Raceway, Prince George, British Columbia; Doug Waller, (604) 561-0035

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Steeltown Speedway, Binbrook, Ontario L0R 1C0; Trevor Harrison, 905-692-3407 (ask for Trevor); email: the_prodigy@zinetonebox.com; web: www.geocities.com/s_speedway

ISRAEL

Sudbury Organized Auto Racing, Val Caron, Ontario P3E 1E6; Brad Peacock, 705-897-1435 (Brad); email: soarsudbury1@hotmail.com; web: www.sudburyrc.no-ip.com

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The All New R.C. World, Hamilton, Ontario L0R 1W0; Dave, Larry or Brian, (905) 765-2301 or (905) 333-3297

THOMPSON VALLEY R/C RACEWAY

Kamloops, British Columbia V2E 2K7; Brent Wende, (250) 372-2917; email: tvrcrc@shaw.ca

VANCOUVER R/C ROAD RACERS

Coquitlam, British Columbia V3E 1K9; Roger Brown, (604) 945-3888

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Nico Prohens Off/On Roaders, Ovalle, 4 Region 1; Nicolas Prohens, (56) 53-711579; email: nprohens@entelchile.net; web: 38939070.home.icq.com/

OFF/ON ROADERS

Santiago, Region Metropolitana 1; Mauricio Wetter Ferrer, (56) 09-8404174; email: mwetter@entelchile.net; web: 38939070.home.icq.com/

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Club De Automodelismo Colombiano, Sanatafe De Bogota D.C., Bogota; Jorge Delgado, 1-6130588

GAROSO RACEWAY

Cucuta; Gabriel Rodriguez, 975-751892

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Club de Automodelismo RC10 Costa Rica, San Jose, San Jose; Osvaldo Averhoff A, (506) 2862353; email: nitro-cr@hotmail.com

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Hispanidad San Pedro, Montes de Oca; Randall Jimenez, 506-280-9078; email: hobbymaniasstore@hotmail.com; web: www.hobbymanias.com

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Racing Model Club, Nicosia; Andrea Sotiriou, 493186; fax 493229

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Brondby Motor Club, Brondby 2605; Soren Boy Holst, 45-36-472-462

Holstebro R/C Buggy Club, Holstebro 2600; Michael Brusholt, 45-97-412-734

Klub 144 Raceway

Lynby 2800; Henrik Carstens, 45-42-88-3691

Rainbow Raceway

Copenhagen 2600; P. Christensen, 45-52-848-504

Thor Minirace Odense, Odense N 5240; Ulrich Rasmussen, 45-65-303-707

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Adoca R/C Speedway, Santo Domingo, (809) 220-5266

La Barranquita R/C International Speedway, Santiago, (809) 582-2303

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Chessington Radio Car Club, Worcester Park, Surrey; Ian Spiller, 0252-20657

Hampshire Racing Center

Basingstoke, Hampshire; Tony Eudola, 44-1276-61402

Hinckley RCCC, Hinckley, Leicestershire; Bruce, 01455-890580

Snetterton Market Model Car Club, Norwich, Hampshire NR16 2JU; Lee Shore, 01760 724857; email: kekezza@fsmail.net; web: www.wheel-spins.co.uk

Worcester Model Car Club, St. John's, Worcester WR2 6Q9; Mr. Hardy

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Auto Electron, Limoges 87000; M. Boudoul, 55 062763

Auto Model Club de l'ouest, Lojheret 29470; Peuziat Michel, 98071764

Crame Roncay, Mons el Baroeul; Michael Houdet, 33-20042755

CSRM, Lyon 69009; Pierre-Yves Monfroy, 06 78880852

Lorgies Bolides, Lorgies 62840; Houdet Sabine

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Dreykorn Raceway, Lauf 91207; Hermann Hensel, 09123-81457

MAC Zweibruecken, Hueffler 66909; Matthew Bailey, 011-49-6384-1388; email: matthew_w_bailey@hotmail.com; web: www.geocities.com/matthew_w_bailey

MC Koln, Worringer 50769; Ralf Habel, 02733-477493

Mini Car Club Dortmund, Dortmund 4600; Roland Schwan, 0231/213609

Oberhausen-Altstaden, Oberhausen 46099; Josef Holl, 0208-403676

Panik Raceway, Troisdorf 53844; Guido Kraft, 0224-400259

HONDURAS

Autodromo Accion, San Pedro Sula; Carlos Rivera Hernandez; Eduardo Hondal, (504) 52-2061

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H.K.R.C. Model Car Racing Club, Hong Kong; Alex Chan, (852) 659-2822

Kingsville Buggy Arena, Shatin; Pak Yeung, (852) 607-0828

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Abadi Circuit, Bandung, Jawa Barat 40141; Adi Darmawan, 62-22-2012250; email: darmawaa@bdg.centrin.net.id

Ancol, Jakarta, ACT 14350; Andre Supryanata, 62 21 6506040; email: andre@cbn.net.id; web: www.auvis.com/ja

Jakarta International Twin Circuit, DKI Jaya, Jakarta; Fayakhun Andriadi, 6221-751243g; email: fayakhun@soon.com

Karinda Off-Road R/C Car Model Circuit, Jakarta-Selatan 12440; Wiwied W. Soedarmadi, 62-21-7900878

Pondok Cabe Circuit, J.L. Kunir No. 83, Jakarta; Ali Agus Salim, 7403568-9; fax 7491533

ISRAEL

IRCCA On-Road Raceway, Rishon Lezion 75650; Shachar Ken-Dron, 972-56-470037; email: dawn@down.co.il; web: www.touring-car.up.co.il

Nahshoneat, Haifa 32809; Golan Levy, (972) 039386444 or (972) 04231252

ITALY

AF MODELS RINGS, COLLEGNO, ACT 10093; ADRIANO FORATO, +39.335.82.58.434; email: afmodels@m-net.it; web: www.afmodels.com

Kadena R/C Car Club, APO, AP 96367; Ron Nason, 011-81-611-733-1334; email: Ron_Nason@hotmail.com; web: home.attmil.ne.jp/b/Carmen_Nason/home.htm

Xlwakuni R/C Track, FPO AP 96310-0978; David T. Eck, 81-6117-53-3662

Yokota R/C Racers, APO, AP 96326-0034; John Baker, 90-001-81-31175-7-6471; email: a4jb@yta.attmil.ne.jp

KUWAIT

Inferno DX 4WD Track, Ahadi 61002; Yousuf Acqatari

LEBANON

Wild Willy RCC, Beirut, 00961-4-403751

MALAYSIA

Acme Speedway, Georgetown, Penang, PB 10000; Moey Chee Cheong, 604-2613175 & 6012-4189388; email: s_jamm@hotmail.com

Jump Square Arena, Selanor; Thomson Chong, (603) 656-2513

Niko Sales & Service Centre, Johor Bahru; Niko Cheng, (607) 234-3615; email: niko3@pd.jaring.my; web: www.niko.com.my

Titivangsa Raceway, Kuala Lumpur; R.A.C.E. Sdn Bhd., 03-2614496

TP Racing R/C Raceway, Selangor; WONG SOO WEI, +603 56388160; email: wong@tp-racing.com

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Alces Off Road, Ensenada, BC 22830; Jorge Bustamante, 667-6-1476, 61477, 86729

Baja JR, Guadalajara, Jalisco 45000; Memo, Pancho, 33-3671-5432/33-3832-0155; email: baja_jr@hotmail.com

Club Dinamo Monterrey, Monterrey, Nuevo Leon 64890; Daniel Ornelas Elizondo, +52 (818) 3574588; email: daniel26or@hotmail.com

Club Kyosho Mexico, Mexico, DF 04330; Fernando Lopez, 52 55 (56894150); email: Omega@avantel.net; web: www.speedshopmexico.com

Desestreza Racing Club, Aguascalientes, Aguascalientes; Luis Lopez, 44 98 961296; email: luis_lopez@jabil.com

Hobby Centro, Guadalajara, JAL 45550; Alejandro Ortiz Del Toro, 36-21-46-28

Hobby Model's Raceway, Morelid, Michoacan 58260, 431-5-01-22

Hobby's Formula., DF 01120, 905-502-3620

Jaguar R/C Club, Puebla 72150; Denise or Chiro, 22-31-00-91, 22-33-00-94

La Hielera, Queretaro, QRO 76160; Jorge Morelos Rabell, 42-12-15-25

Micromotori Club, Jalisco, Jalisco 44640; Francisco Ortiz Sevilla, 52-36418672; email: fstmryr@hotmail.com

Nitro Racers, san jose del cabo / los cabos; Franco Meza, (114) 1424422; email: tcostate@prodigy.net.mx

Pista Casino, Cuernavaca, Morelos 16507; Luis Duhart, 73-19-12-38

R/C Racing Hobbies, Lopez Mateos Sur 2077, Guadalajara; Marcelo Garciarce, 33-3121-7185; email: ventas@rcracing.com.mx

Tony's Track, Culic-n, Sinaloa; Guillermo Prieto, 67-165708-168141

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ERCE Eindhoven, Eindhoven, ACT 5627N; Henk Fick, 040-2480607; email: info@erceracing.nl; web: www.erceracing.nl

H.F.C.C. Hollandia, The Hague; G. de Jong, 031-070-3679820

M.A.C. Vlymen, Nieuwkuik; Arjan van de Graaf, 31-416-376298

R.C.T.D. Circuit, Dordrecht, Zuid Holland 3316 GN; Jan van Kooy, 31-78-618-11-84; email: pkracing@bit.nl; web: www.pkracing.nl

NEW ZEALAND

Capital Model Racers, Lower Hutt; Roger Whitmarsh, 04-566-5714

Counties R/C Raceway, Pukekohe; R. Northcott, 09-23-86904

Harewood Radio Control Car Club, Christ Church; Dean Johnson, 09-0-3880 344

Papakura Indoor R/C Car Club, Auckland; Colin Perry, 09-298-4711

Western District R/C Off-Road Car Club, Auckland; Chris, 09-838-5201

NORWAY

Aurskog R/C Club, Aurskog; Tommy Gjeleseth, 47-63-86-21-61

Dalen Raceway, Molde; Johnny Reitan, 94 64 52 95

Hadeland Raceway, Gran; Dag Bakke-Nilsen, 61330405

Lornskog RC Bane Track, Sorlihavna; Terje Rosemo, 47-952-44269

Store-Baller Raceway, 3/17/99 61330225; Ola Raastad

PHILIPPINES

Boyet R/C Hobby Shop, Rizal; Jose Chua, 721-2555

Philippine F1/Touring Club, Quezon City, Manila 1156; Raymond Aguilar/Ron Villafior, 896-64-15/23-30-08

Philippine R/C Association, Manila, Manila; Ronald/Manny Villafior, 23-30-08

QCRCC Quezon City Radio Control Car Club, Quezon City 1008; Desthy, Emer or William, 0917-8911698; email: emerlitoa@quickweb.com.ph; web: www.qcrcc.cjb.net

PORTUGAL

Aero Clube da Madeira, Madeira, fax 091-221265

SOUTH AFRICA

B.R.C.A. Bokisburg Radio Car Association; email: recycle@netactive.co.za; web: www.recycle.co.za

Banana County R/C Racing Club, Margate 4275; Dennis Steenmans, 27-0-391-20975

Frantic Raceway, Welkon; Wayne Roodt, 27-57-35-72849

Gordons Bay R/C Club (GBRC), Gordons Bay, Cape Province; Andre Hollander, 024-512865

Grand Prix Electric Car Club, Brakpan, Gauteng; Gary Gibson, 27-11-826-1720

Helderberg Radio Control Car Club, Somerset West, Cape Province; Andre Hollander, 024-51-2865

Lowveld Radio Control Thunderdrome, Nelspruit, Eastern Transvaal; Martin Van Der Merwe, 01311-534-6415

MERC Racing, Rustenburg, RSA
0300; Gerrie Pretorius, 014-5974569

Norkem Raceway Club, Gauteng; Dan de Agrella, 2711-972-7011; email: craig@mmweb.co.za

Parow Radio Car Club, Parow, Cape Province; Stirling Spengler, 021-945-4957

Parow Radio Control Car Club, Parow, Cape Province 7530; Craig, +27 21 919-5859; email: craig@kingsley.co.za; web: www.speedmodels.za.org

Phoenix Raceway, Stiffontein, Transvaal; Lionel Edwards, 018-4842863

Pick 'n' Pay Model Car Club, Klerksdorp 2570; H. Grobbs, (27) 18 46245421

Pietersburg Model Racing, Pietersburg, Northern Transvaal; Peter Van Vuuren, 0152-293-0700

Pretoria Model Racers, Pretoria, Gauteng; Deon Cerf, 27-063-630-2045; web: www.pretoriarm.co.za

Pretoria Off Road R/C Club, Pretoria, Gauteng; Gert Swart, 012-377-3238

R.A.C.E. Off Road, Maraisburg, Gauteng; Derrick Plank, 682-2173

R.C. Superbowl, Elsburg, Johannesburg; Karl Fawcett, 27119076145

Rustenburg Off-Roaders, Rustenburg, Northwest Province; Jan Van Vollenhoven, 0142-24-846

SPAIN

A.D. Diabillos, Zaragoza; Carlos Picente de Vera, 34-76-605350

ADAM, Madrid; Alvaro Sarabia, 01-7471113

Club Modelismo Catilla, Burgos 09080; A.J. Pereda, 34-47-240130

Club Social Sevillana, Granada; Oscar Saenz, 958-275282

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Motoclub Castellon R.C., Castellon; Octavio Traver, (34) 64 229705, (34) 64-237411

Outlaw-Ultima II, Madrid 28016; Juan Vacas, 915197298

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Amalie Racetrack, Sollenbrunn 5-46632; Tage Johansson

PROCAR Speedway, Veddige 430 20; Lars Nordin, 46-0-340-38784; fax 46-0-340-38694; email: info@procar.se; web: www.procar.se

Sollenbrunn Miniracing Club, Alingsaas; Tage Johansson, 46-322-40944; email: tage.j@swipnet.se

Staffanstorps Highway 1:8 Track, Staffanstorps 245 45; B'rie Petersson, 46 0 46-256832

torvinge raceway, rappestad, SP 59047 vikingstad; mats johansson, 013-808445; email: mats.j@swipnet.se; web: drive.to/mirac

Touring 1:10 Raceway (& Mini-Z Raceway), Ronneby, Blekinge 372 35; Mikael Nilsson, +046 457 160 07; email: mickel2@telia.com; web: drive.to/rcc

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ERMC Raceway, Grand-Saconnex 1218; M. Maurer, 19-41-22-798-9765

JMRCV-Terraindu Levant, Geneva 1290, fax 19 41 22 7790805

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Hot Rod Raceway, Bangkok 10310; Mr. Vichai Vongphate, (662) 8602922-5

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R/C Mariche, Caracas DF 1070-A; Bruno Morganti, 58-02-241-3969 or 241-4993

Santa Paula R/C Club, Caracas; Abecasis or Franco Agrusa, 02-2423954 or 02-4510314

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| <input type="checkbox"/> Oval | <input type="checkbox"/> Minis & Micros | |

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|---|--|
|  Indoor |  Concrete |
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HARDCORE RC GUY CHALLENGE

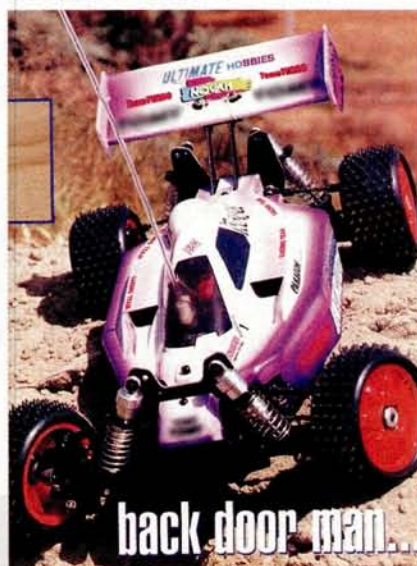
So, you think you're an RC expert, eh?

We'll see. Make it through the Hardcore RC Guy Challenge, and then we'll see how tough you are. We'll draw a winner from all the correct entries received by December 31. Prove your mettle! Email your answers to hardcorercguy@airage.com or snail-mail them to the address in the upper-left corner. The winner will receive an RC10B4 Ready to Run!



1

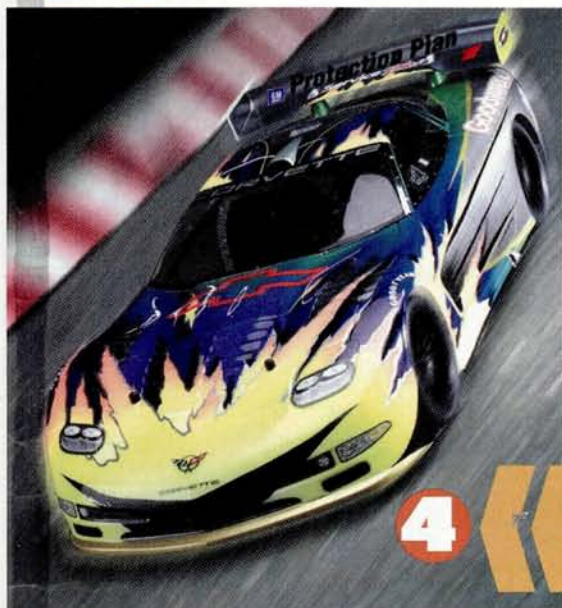
Name this car, AND the company that brought it into the states.



back door man...

2

A certain well-known toy company tried breaking into the serious RC market with this very capable 4WD buggy. Name it. Bonus points: what other RC product did *RC Car Action* cover from the same company?



4

This is the Tamiya Manta Ray, which was the basis for many Tamiya kits. Name all of them, including the body variations.

Here's Steve Pond's 100mph project car from the second issue of *RC Nitro*. The Corvette body is killer; who painted it?



3

Vintage Hetmanskil

Kevin made the mistake of bringing in his RC scrapbook, which included this photo of a 13-year-old Kev with his first trophy—a photo that looks eerily similar to this picture of Hingeboy with his most recent trophy from the RC Madness Fall Classic. (For the record, he won first place in the Monster Truck A-main, running an Associated Monster GT for the first time). Kev, you may have lost the trucker hat and the hair that was under it, but you gained a goatee. And 110 pounds.

